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1.0 Introduction

This project is solving one of the United Nations Sustainable Development Goals (SDGs) out of 17 great challenges set by the UN. Our SDG has been **SDG 3: Good Health and Well-Being**, and we are talking about the area of providing mental support and emotional health. Mental health is a universal issue in that it affects the life of every individual, how he or she functions in school, and even social life. The World Health Organization estimated that approximately **450 million people** were affected by neuropsychiatric disorders and that mental and neurological diseases and disorders caused **31% of all disability** in the world **(Saraceno, 2002).** The report also said that at some time in their lives, mental and behavioural disorders affect **over 25% of people (Saraceno, 2002).** According to recent research, anxiety disorder is one of the most common mental health disorders in the world, and in **2019**, an estimated **301 million people** were living with anxiety disorders **(Javaid et al., 2023). But emotional suffering,** which is intangible**, is not always** recognized. Other causes, including stigma, discrimination, and misunderstanding, may be the reason why a great number of people do not seek help. This is significant in providing access to and early-intervention responses that can be used to assist the user before they hit the mark of emotional difficulty, which can become a problem. We suggest **EmotiTrack**, an AI-powered wearable wellbeing support system designed to assist users experiencing sensory overload, stress-related patterns, and emotional regulation challenges. It employs wearable devices, machine learning techniques, biometric data, and adaptive user interface features to identify indicators of emotional distress and provide supportive interventions. In the **EmotiTrack** process, passive tracking and proactive support interventions, including transforming the user interface and seeking out haptic feedback when grounding, OS notifications to the user, and even customizing the user experience based on the user's current needs and context.

1.1 Team's Vision and Mission

As a team, we understand our vision to be easy, accessible access to emotional support through technology for all kinds of people across all types of circumstances with all emotional needs. **We believe technology** should not only focus on the concept of utility but also on people's emotions, promoting happiness and a more caring society. It aims to design a **user-friendly** system to identify indicators of stress-related patterns, to provide timely supportive interventions that promote calm, and to connect the user to a trusted caregiver in an emotionally vulnerable time of crisis. In this project, **Human-Computer Interaction (HCI)** is also of key importance, applying approaches about accessibility, emotional comfort, usability, privacy, and neurodiversity. We hope **EmotiTrack** will contribute to a healthier and happier world.

2.0 Problem

The problem of mental health in students at universities has now become a troubling trend throughout the world, particularly in terms of stress, anxiety, and emotional burnout that is the result of the academic pressures and daily life challenges. Most students find it very difficult to control their feelings appropriately as they juggle between the tasks, exams, social pressures, and personal demands and obligations. It discovered that many university students experience feelings of anxiety, stress, and depression, which confirms that mental health problems are particularly common in college campuses **(Asif et al. 2020).** This state can have a detrimental impact on the academic performance of students, their emotional stability, motivation, and quality of life. In addition to this, the problem of sensory overload given by some of the students since it is noisy and overcrowded or overstimulating can also explain why in certain cases emotional uneasiness and difficulties in communication can occur, especially to those with sensory sensitivities **(Stromberger et al., 2020).** This can make the students feel overwhelmed, emotionally exhausted, and unable to focus sufficiently in their day-to-day school life. Even though mental health awareness is growing, not all students obtain immediate emotional support, as conventional mental health services can be hard to reach, involve time loss, or feel uncomfortable to some people. Thus, a more straightforward, convenient, and technological solution is required that would enable students to be more mindful of their emotional health and allow them to control it more easily. **Our project,** EmotiTrack, is structured to overcome this problem and is a smart mental wellness application that allows students to monitor stress-related patterns, alleviate stress, and enhance emotional awareness, using AI-based support and custom features. Another area where the project is very relevant to the identified problem is that it is aimed to help the students manage their mental well-being easier and more comfortably in their day-to-day lives. According to **(Cruz-Gonzalez et al. 2025),** artificial intelligence has been shown to have great potential in the emotional wellbeing monitoring, early support, and personalized intervention systems of mental healthcare. This justifies the need to incorporate the use of AI technology in mental wellness apps such as EmotiTrack. Moreover, our vision and mission that aim to uplift emotional well-being, lower the stress levels of the students, and make a welcoming digital space, where emotionally healthier behaviors will prosper, are closely adhered to in the project. **EmotiTrack focuses on helping** students have a secure, user-friendly, and accessible site that can facilitate their mental health experience and lead them to be more emotionally self-aware and develop healthier coping mechanisms.

3.0 Solution

3.1 A New Perspective on a Known Problem

Mental health apps are already quite commonplace and tools like those provided by Calm, Headspace, or Wysa have helped to broaden access to mental wellness resources **(Linardon et al., 2019).** Many existing systems face a key limitation, however: the user must actively open the application in order to seek support. During times of great distress, users are often lacking the focus, presence of mind or ability to do so. As research has shown, those with anxiety based disorders and those with sensory overload difficulties have problems identifying their feelings and choices when under extreme duress **(Mazefsky et al., 2013).** During periods of intense duress simply opening an application and navigating through options are far too overwhelming for many people. EmotiTrack was conceived from this problem and designed to work in opposition, offering passive recognition and assistance. EmotiTrack runs quietly in the background, analyzing behavioral and physiological indicators from connected wearable and mobile devices. Once stress-related patterns are identified, the system can proactively offer supportive interventions without requiring immediate user action**.** EmotiTrack is not meant as a diagnostic tool or an application for the clinically afflicted but rather to increase self-awareness while offering a measure of mental wellness support during critical times.

3.2 How the Technology Comes Together

EmotiTrack is built using existing and widely available technologies, including wearable sensors, mobile computing, cloud processing, and machine learning techniques. The innovation lies not in creating new hardware, but in combining these components into a user-centred system designed for emotional accessibility and low cognitive load.

One of the key challenges in this system is interpreting physiological signals in context. It is important to keep in mind that a person's heart rate, by itself, gives no indication of their stress level, anxiety level, or whether they are physically moving about. To help relieve this uncertainty, EmotiTrack takes multiple factors into account; such as the trends in heart rate data, how much a person has moved about, etc. to help improve the accuracy of understanding what state a user is currently experiencing. This reduces false interpretations and improves reliability.

The second component is the adaptive user interface. As the system recognizes stress-related patterns, the interface becomes simpler by minimizing the amount of visualization. In this case, non-essential functions are concealed; the monitor displays only simple support functions. This idea is based on studies demonstrate that people under stress state prefer a lesser cognitive and visual load, especially individuals who are sensitive to sensory stimuli **(Sweller, 1988).**

The last component of the system employs a haptic grounding mechanism. Rather than using text instructions and notifications, the haptics on the smartwatch will provide rhythmic vibration feedback to indicate how and when to perform breathing exercises (breathing-based interventions have been researched extensively and have been shown to reduce users' physiological symptoms of stress **(Zaccaro et al., 2018).** This method of providing support is both unobtrusive and easily accessible, especially since users may not be able to focus on text or screens at certain times.

3.3 A System With Multiple Connected Parts

EmotiTrack is designed as a connected ecosystem rather than a single application. It consists of four main components that work together. The wearable device collects simple physical and mobility data and the accompanying mobile application provides the principal interface to access summary reports, alter preferences and check previously recorded well-being trends. An aggregated data processor, using cloud technology, will generate improved pattern recognition through repeated processing of the aggregated data from many users, resulting in enhanced accuracy over time. An optional portal for caregivers is provided to allow a trusted individual to view updates to the user's health, or possible assistance from the user; however, they will only be permitted access to the data being generated by their loved one with specific consent of the user. An important design consideration was to provide basic functionality for users without internet access to perform such essential functions as haptic breathing guidance and basic interventions. This ensures that the system remains usable in moments where connectivity is limited or unavailable.

3.4 Privacy and Data Control

The design of EmotiTrack recognizes the importance of protecting users' privacy and allowing them to control their personal data when collecting sensitive wellbeing data. All users undergo a detailed consent process before any collection occurs that describes what data will be collected from them, and who will have access to it. All data collected has been encrypted using AES-256, and provides users with control over their data per GDPR (Regulation (EU) 2016/679) compliance. As much as possible, raw sensor data will remain on device and be processed locally in order to minimise additional exposure of users' data. Caregivers' access to user data will be visible and recordable, so users will know who accessed their information and which information has been accessed by them. The objective of this system is to ensure that users are in control of their own data and also establish a trusting relationship with the caregiver through ethical behavioral design of the system.

4.0 Discuss impact of the solution/competitive solutions

4.1 Social Impact

The World Health Organization (WHO, 2022) estimates that every eight people in the world have a mental health disorder, with access to timely assistance being very limited. EmotiTrack fills the gap by focusing on high-need groups: people with Autism Spectrum Disorder (ASD), anxiety disorders, panic disorders, and sensory overload by employing a proactive, technology-based approach rather than the reactive/crisis-based approach that is generally used. **AI-based pattern** recognition is used to analyse physiological and behavioral signals that may indicate stress-related patterns before they become more **significant.** Its whole principle is to lighten the burden on the person and to lighten the burden on the support network too, since its interface is simplified in high distress moments, there's also haptic feedback providing non-verbal calming suggestions, and, if the person chooses to do so, the support network is also notified.

The social effect on this is felt by many stakeholders: those who benefit from emotional information and greater independence; those whose caregivers can respond to with greater understanding of their loved ones' behavior; healthcare providers who have information about the long-term trends to make more informed planning; and those who are learning institutions that can have insights into students who are in distress before their academic success is affected. Furthermore, EmotiTrack contributes to the destigmatization of mental health by normalizing the use of wearables to track mental states, thus supporting SDG 3: Good Health and Well-Being.

4.2 Broad vs Deep Impact

EmotiTrack has the potential to create a broad and meaningful impact. The global smartwatch market is projected to reach more than 230 million units sold annually by 2026 (Statista, 2023), which means that many of the prospects are already capable of using these smartwatches. This reach extends with the increasing number of institutions recognizing the importance of mental health, especially in educational institutions, workplaces, and health systems.

EmotiTrack goes deep, however, by catering to users whose needs are not being addressed by mainstream wellness applications. The system can analyse physiological signals and provide

optional supportive prompts, but people with ASD might have trouble expressing distress verbally. Recognizing early warning signs will help lessen the risk of patients with panic disorder escalating and can be helpful in their continued self-management. This results in a life-long improvement of emotional self-regulation and quality of life and thus does not only apply to a single use of the application.

4.3 Problem Solving

Existing mental health tools share a critical limitation: they are reactive. Meditation apps require active engagement that is often impossible during distress. Therapy occurs retrospectively. Crisis services address only acute emergencies. This leaves a significant gap in proactive, real-time support—especially for neurodivergent individuals who may be unable to self-report distress in its early stages.

EmotiTrack closes this gap through continuous wearable monitoring and AI-driven pattern identification. Healey and Picard (2005) showed that there is a clear correspondence between the biometric signals (heart rate, skin conductance, and EMG) and stress state in real-world situations. On this basis, EmotiTrack uses machine learning algorithms to analyse individual behavioral patterns and to offer recommendations for well-being at the right moment via haptic feedback, guided support in the app, and—if desired—by way of a caregiver alert. The platform's ability to track mental health trends in a longitudinal fashion was also supported by passive sensing data from mobile devices, as shown by Mohr et al. (2017), who found clinically meaningful insights from passive sensing data from mobile devices.

Limitation

Wearable device biometric data quality and consistency is key to EmotiTrack effectiveness. Predictions may not be as reliable as sensor accuracy ranges from model to model, and gaps in predictions due to battery depletion or removal of the device can occur. This system is intended as an aid to the mental health system and is not to be used to diagnose mental health conditions.

5.0 Discuss business viability application

5.1 Technical Viability

EmotiTrack is technically feasible as it uses existing digital health and wellbeing technologies. The system features one connected ecosystem of a smartwatch, mobile app, cloud computing, machine learning and caregiver portal. The smartwatch will gather manifestations of physiology and behavior, including the tendency of heart rate, activity level, movement, etc., and will transmit the information to the mobile application for analysis. These patterns related to stress are detected through machine learning techniques, which, in turn, help in order adaptive interface modifications and appropriate wellbeing interventions. This is helpful in providing context aware support while not stating it would provide medical diagnosis or clinical assessment. Cloud computing also boosts the system features with security processing and data synchronization, temporary storage, and real time functionality. Smartwatch platforms are already available, and they offer medical applications secure ways to send health indicators to apps, thereby minimizing implementation complexities. A caveat though, is that EmotiTrack is reliant on a smartwatch integration, not all students are required to have or frequently use a smartwatch. In the future, more options like wearable alternatives that do not cost as much as the carafe can be pursued to bring accessibility. The bottom line is, that the technologies needed for EmotiTrack exist, are possible and viable for future development and application.

5.2 Economic Viability

EmotiTrack is economically viable due to the implementation of smartphone, smartwatch, cloud and machine learning technologies, which are all available in the market. This eliminates the need for special hardware, and high-priced physical infrastructure, and thus decreases the development and implementation costs. This system relies primarily on the digital, and can be cost controlled using scalable cloud platforms. The system can be scaled up or down to meet the demand of its users, and it is also cost-effective. The price to invest is also not a huge obstacle because many people have smartphones to use and have the choice of using smartwatches. From an organisational perspective, EmotiTrack is designed to help foster an awareness of wellbeing and provide early intervention without any significant investments in infrastructure. It's cloud-based, which means that universities and institutions can increase its use over time without getting inundated by expenses. The overall benefits of the EmotiTrack compared to the costs of development and implementation are sprawling and sufficient, making for easy deployment in the future with financially sustainable results.

5.3 Business Model

<table>
<tr><th colspan="4">EmotiTrack - Business Model Canvas</th></tr>
<tr>
<td colspan="2">1- Key Partners
➢ Higher education institutions/universities
➢ Counseling centres and mental health professionals
➢ Wearable device platforms (Apple Watch, Wear OS, Fitbit)
➢ Cloud service and cybersecurity providers
➢ Emergency service / SMS / email API providers
➢ Research and healthcare collaborators</td>
<td>2- Key Activities
➢ Data processing and monitoring of biometric data in real-time solution.
➢ AI Stress / emotional distress pattern analysis
➢ Mobile app and smartwatch integration
➢ Delivery of alerts, grounding support, and SOS features
➢ Platform maintenance, testing and updating
➢ Security & privacy, compliance management</td>
<td>4- Value Propositions
For Users:
➢ Early detection of stress, anxiety, and emotional distress
➢ Real-time support through grounding exercises and alerts
➢ Adaptive, accessible interface for vulnerable users
➢ Improved self-awareness and proactive well-being support

For Caregivers / Institutions:
➢ Timely alerts and well-being reports
➢ Better understanding of user patterns and support needs
➢ Scalable digital well-being solution without building from scratch</td>
<td>7- Customer Segments
Primary paying customers:
➢ Universities
➢ Care centers and special support facilities
➢ Workplace well-being programs

Potential future customers:
➢ Health insurance providers

End-user beneficiaries:
➢ Students and young adults
➢ People with anxiety, panic attacks, or sensory overload
➢ Caregivers and support staff</td>
</tr>
<tr>
<td colspan="2">3- Key Resources
➢ Mobile application and smartwatch integration
➢ AI / machine learning models
➢ Cloud infrastructure and secure databases
➢ Development and maintenance team
➢ Mental health expertise and research knowledge
➢ User support and security framework</td>
<td>5- Customer Relationships
➢ Personalized digital support
➢ Secure caregiver collaboration
➢ Notifications and follow-up support
➢ User feedback and continuous improvement
➢ Trust built through privacy and consent-based access</td>
<td>6- Channels
➢ Mobile application (Android and iOS)
➢ Smartwatch companion integration
➢ University wellbeing and counseling programs
➢ Care centers and support facilities
➢ Workplace wellbeing programs
➢ Institutional onboarding and partnerships</td>
</tr>
<tr>
<td colspan="2">8- Cost Structure
➢ App design, development, and maintenance
➢ Cloud hosting and storage
➢ AI model training and optimization
➢ Cybersecurity and data protection
➢ API / notification / SMS integration costs
➢ Compliance and operational support</td>
<td colspan="2">9- Revenue Streams
➢ Annual institutional subscription licensing
➢ University licensing packages
➢ Care center / support facility subscriptions
➢ Workplace well-being program subscriptions
➢ Future partnerships with health insurance providers
➢ Research or collaboration funding opportunities</td>
</tr>
<tr>
<td colspan="4">Note: It is free for students to use via participating institutions, with no student data being shared with universities or involved in the process without their consent.</td>
</tr>
</table>

EmotiTrack is offered on an annual nutrition institutional subscription basis. In this model, end users like students and employees and care receivers can access the platform free of charge via participating organisations. On a per contract basis, income comes from an annual

subscription paid by universities, care centres, special support centres and workplace wellbeing programmes.

This model has been selected as it maintains platform access whilst supporting the organisations to enhance the wellbeing service. EmotiTrack can be utilised by Universities to ensure student wellbeing and enhance student satisfaction. It can help care centers to enhance service quality and establish trust with families. It can feature in employee wellbeing programs in the workplace, and in employee engagement, productivity, and retention support. Future opportunities include also engaging health insurance companies in partnerships to help support a healthy life. Organizations have to pay an annual subscription fee; however, their benefits may outweigh the costs. Using improved reputation, service quality, user satisfaction and support for well-being can assist with being able to attract and retain student, clients, employees or policy holders. Consequently, the annual subscription means EmotiTrack has a viable revenue stream while delivering organisations access to an integrated digital wellbeing solution on a scalable basis without having to create a new system themselves.

5.4 SWOT Analysis

Three similar digital well-being apps (Headspace, MindDoc, and MindMate) were selected, and a SWOT analysis was carried out to understand the competitive landscape. Competitors selected include those specializing in offering support to well-being, self-monitoring, and digital mental health assistance. The analysis encompasses market trends and the existence of unsolved problems and identifies the new value of the EmotiTrack project, which is based on the use of smartwatches for monitoring, behavioural pattern analysis, the integration of the institutions, and the support of well-being based on context.

Competitor 1: Headspace

Strengths	Weaknesses
Strong brand recognition.	Limited physiological monitoring through smartwatches.
Larger global user base.	Focuses mainly on meditation and stress management.
Extensive mindfulness.	Limited caregiver involvement features.
Opportunities	**Threats**
Integration with wearable health technologies.	Increasing competition from AI-driven well-being.
Expansion into institutional wellbeing programs.	Growing user demand for personalized support.
Development of behavioural monitoring features.	Privacy and data protection concerns.

Competitor 2: MindDoc

Strengths	Weaknesses
Behavioural and emotional self-monitoring features.	Limited real-time physiological monitoring.
Data-driven wellbeing insights.	Limited caregiver integration.
Strong focus on pattern tracking.	Less suitable for institutional deployment.
Opportunities	**Threats**
Expansion through smartwatch integration.	Competition from larger wellbeing applications.
Partnerships with universities and care centres.	Rapid technological advancements.
Adoption of real-time wellbeing monitoring.	User concerns regarding personal data security.

Competitor 3: MindMate

Strengths	Weaknesses
Comprehensive wellbeing and self-care tools.	Limited behavioural pattern analysis.
Easy to use mobile platform.	Limited physiological data collection
Long-term wellbeing management support.	Limited institutional support features.
Opportunities	**Threats**
Expansion into workplace wellbeing programs.	Strong competition from established wellbeing platforms.
Integration with wearable devices.	Increasing demand for AI-assisted personalization.
Growth in digital wellbeing services.	Rapid changes in user expectations.

As for these competitors, EmotiTrack provides a more holistic solution by integrating smartwatch physiological and behavioural tracking, instant wellbeing analysis, contextual support, and caregivers and institutional participation. It offers an early support programme which is not based on a medical diagnosis and can be integrated into workplace wellbeing programmes, care centres and universities with an institutional subscription model.

6.0 Architectural overview

6.1 Technical Architecture Diagram

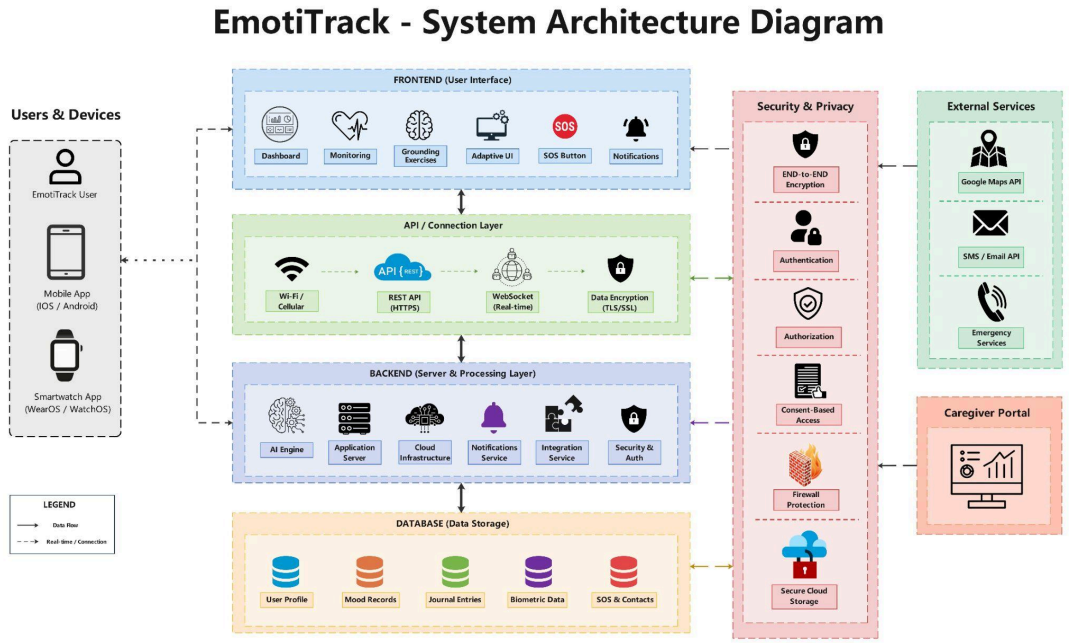


Figure 1: EmotiTrack System Architecture Diagram

The proposed EmotiTrack system will be designed as a cross-platform mobile application on Android and iOS devices. Accessing the system is carried out using the mobile application, or an optional smartwatch for real-time continuous biometric monitoring and stress detection. However, wearable devices are useful because they may measure physiological data like heart rate, activity level, and markers of stress which are useful for mental health monitoring **(Long et al., 2022).** EmotiTrack's system architecture is presented in Figure 1: EmotiTrack System Architecture Diagram. The main features for the user at the Frontend layer are: Dashboard, Monitoring, Grounding Exercises, Adaptive UI, SOS Button and Notifications. These features enable users to monitor their emotional health, get notifications, and obtain relaxing assistance whenever necessary. This mobile app employs REST APIs, WebSocket, and secure data encryption to facilitate communication between the application and backend services via the API and Connection Layer. The real-time synchronization and the instant delivery of the alerts are also possible in WebSocket with a continuous communication between the client and server **(Pimentel & Nickerson, 2012).** Encryption is employed to protect sensitive information that is transferred using TLS/SSL encryption **(Ren et al., 2010).** The main system functions, such as AI Engine, Application Server, Cloud Infrastructure, Notification Service, Integration Service and Security & Auth are handled by Backend layer. Stress patterns are analysed using AI, with AI emotion detection being able to detect emotional states from various sources **(Marechal et al.,**

2019). Healthcare-related systems can be scaled, made reliable, and securely processed on cloud infrastructure **(Islam & Bhuiyan, 2023).** User profiles, moods, journals and Biometric information and SOS contacts are stored on the Database layer. The Security and Privacy layer involves end-to-end encryption of all the data, authentication and authorization features, secure cloud storage, and consent-based access, to name just a few security features that EmotiTrack applies to such sensitive emotional and health-related data. Maintaining the privacy and security of information is critical for Mobile health applications to protect sensitive user data from unauthorized access and misuse **(Martínez-Pérez et al., 2015).** External Services like Google Maps API, SMS/Email API and Emergency Services are used for location tracking, emergency notifications and SOS communication. Google Maps API is capable to provide location and navigation data that is relevant to the circumstances in a crisis **(Yousif & Ibrahim, 2023).** Caregiver Portal allows the authorized caregiver to follow up on wellbeing reports and receive alerts in case of emergencies safely. In sum, this design illustrates that EmotiTrack aims to be a safe, scalable and usable mental health support system.

6.2 Feasibility Studies

Technical Feasibility:

EmotiTrack is technically possible as the technologies needed can be found and used a lot in mobile use. The system can be designed as a cross-platform application and could be integrated with a smartwatch for biometric monitoring (optionally). The key features of the system can be achieved using existing technologies, including REST APIs, WebSocket, cloud infrastructure, AI-back databases for analyzing transactions and secure databases. Nonetheless, there are potential technical hurdles that could arise, including compatibility of wearable devices, battery life and sensor accuracy that will require testing and optimization before implementation.

Financial Feasibility

EmotiTrack is financially viable, due to a university licensing model. Rather than requiring student payment, Universities may opt-in under their own selfHealth initiative and all students who are subscribed to the application can then access it at no cost. This model would be more appropriate since pupils should be able to access mental health care. The university will not collect any personal emotional records, biometric information or journal entries to safeguard privacy. Insights on specific use (apart from anonymous and general usage) cannot be used for service improvement. This helps to ensure that the system is financially viable while ensuring users are trusted and protected.

6.3 Technologies and Resources Used

The EmotiTrack system utilizes several different technologies and resources, summarized below, which support various parts of the application's functionality, security and real-time communication.

Technology / Resources	Purpose
Android & iOS	Mobile application platforms
Smartwatch (WearOS / WatchOs)	Biometric and Stress monitoring
REST API (HTTPS)	Communication between frontend and backend
WebSocket	Real-time synchronization
AI / Machine Learning	Stress detection and emotional analysis
Cloud infrastructure	Data processing and scalability
Google Maps API	Location tracking during SOS Situations
SMS / Email API	Emergency alerts and notifications
TLS/SSL Encryption	Secure data transmission

Overall, these technologies enhance the primary functionalities of the main system such as access to the mobile, examination by biometric, detection of stress by Al, data safety, movement with data to the cloud for processing, communication with emergency services.

7.0 System Requirements and Scope

7.1 Questionnaire Design and User Requirements Analysis

We developed a structured questionnaire and distributed it via Google Forms to investigate user perceptions of EmotiTrack.Our instrument was designed to assess four key areas: experiences with emotional wellbeing, comfort levels regarding wearable-based monitoring systems, preferred intervention modalities, and desired features in a digital wellbeing support application.

We collected a total of 57 responses from students across multiple faculties at Taylor's University. Although our sample is not representative of clinically diagnosed populations, it provides meaningful insight into the general student experience of stress and emotional wellbeing, which subsequently informed our formulation of the system requirements.

Respondent Background

Participants were selected from a variety of different academic areas: Computer Science, Medicine, Engineering, Design, Law, Business, Hospitality, Biosciences and Health Sciences. The diverse disciplines helped provide a balanced view of usability, accessibility of tools for, and attitude toward, technology-mediated wellbeing.

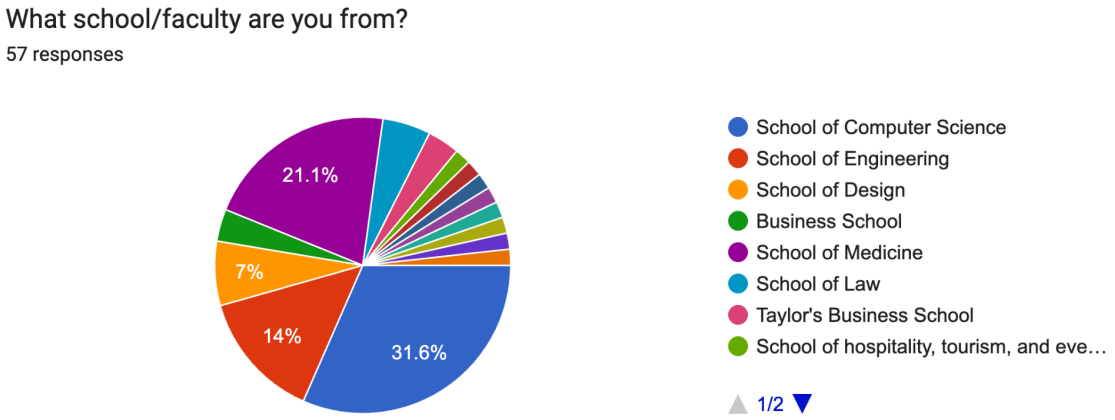


Figure 2: School/Faculty of Respondents

Respondents also tended to be students aged 18 to 25 years old (86% of all respondents), which is usually true of an average university attendance rate. Most respondents also were users of mobile or other digital technologies with a relatively high frequency. The research was conducted using a sample of participants who are affected by chronic anxiety disorders or neurodiversity. This group provided us with a useful baseline to support our initial design validation efforts.

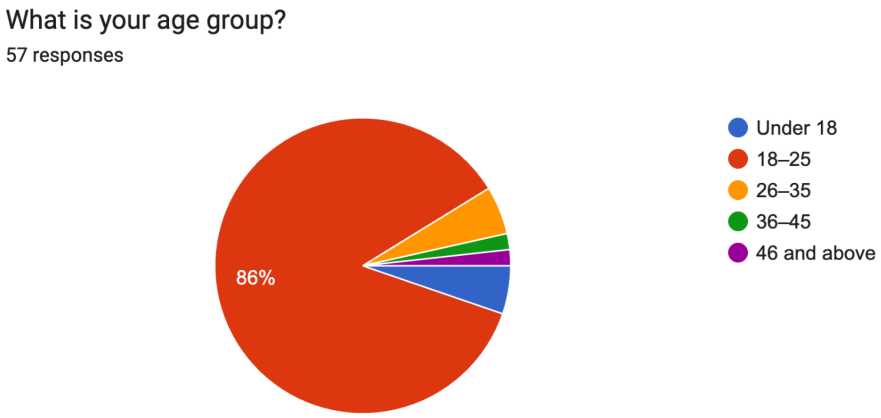


Figure 3: Age Group Distribution of Respondents

Demographics

Although EmotiTrack was developed for users with chronic anxiety disorders or who are neurodivergent, the gender distribution was fairly balanced, with 52.6 percent of the sample identifying as female, 42.1 percent identifying as male, 3.5 percent preferring not to identify their gender, and 1.8 percent identifying as nonbinary or another gender.

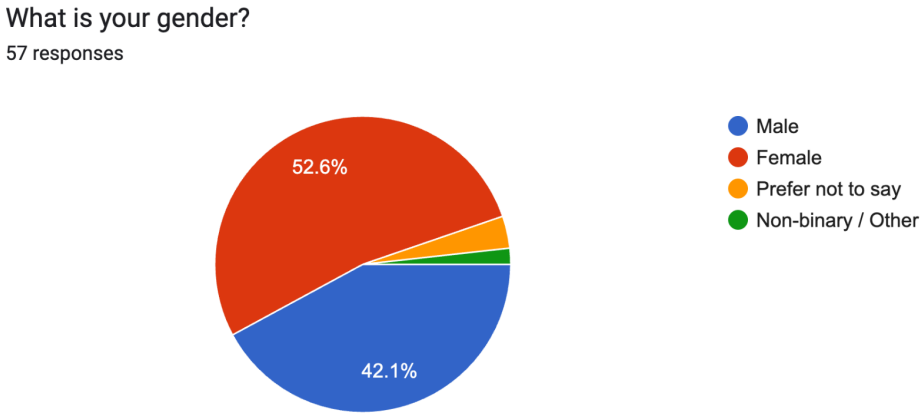


Figure 4: Gender Distribution of Respondents

Mental Health Distress Awareness

A significant number of individuals (73.7%) indicated that they had suffered from one of the symptoms related to stress, anxiety, emotional overload or panic attacks at some stage of their life. Such a finding suggests that all students suffer stress on an emotional level, which is not restricted to clinical populations.

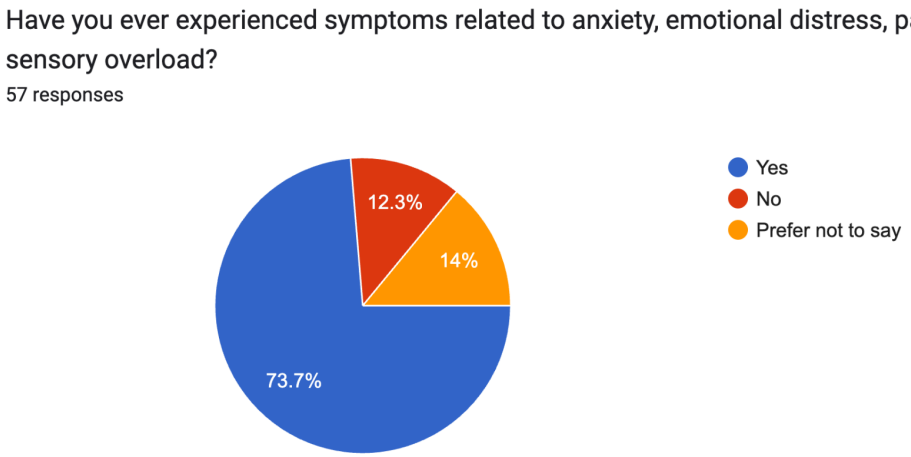


Figure 5: Mental Health Distress Awareness

With regard to mental health literacy, 75.4% of our participants were familiar with the most common types of mental health problem (anxiety, panic attacks, autism) while 7% were somewhat familiar and 17.5% of participants had never heard of them.

In addition, 75.4% reported having experienced emotional distress at least once a week (with 45.6% saying they experience emotional distress about 1-2 times per week and 28.1% reporting 3-5 times per week). We believe this supports the need for a system that provides continuous wellbeing support rather than relying solely on user-initiated interaction.

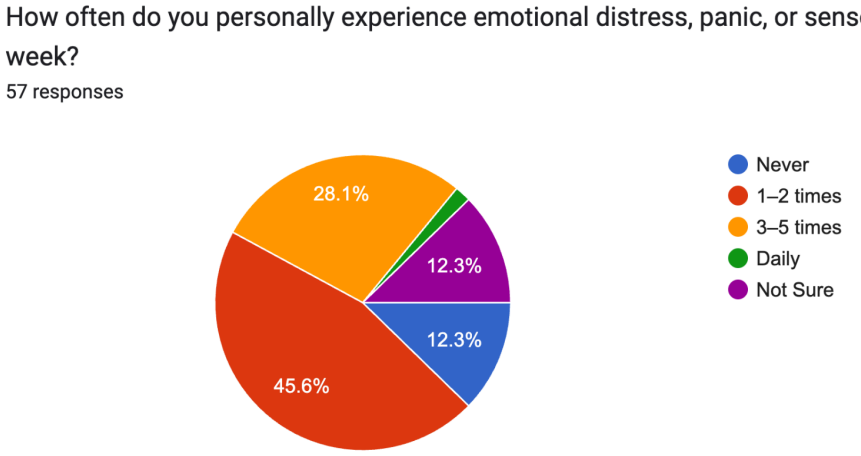


Figure 6: Emotional Distress Frequency

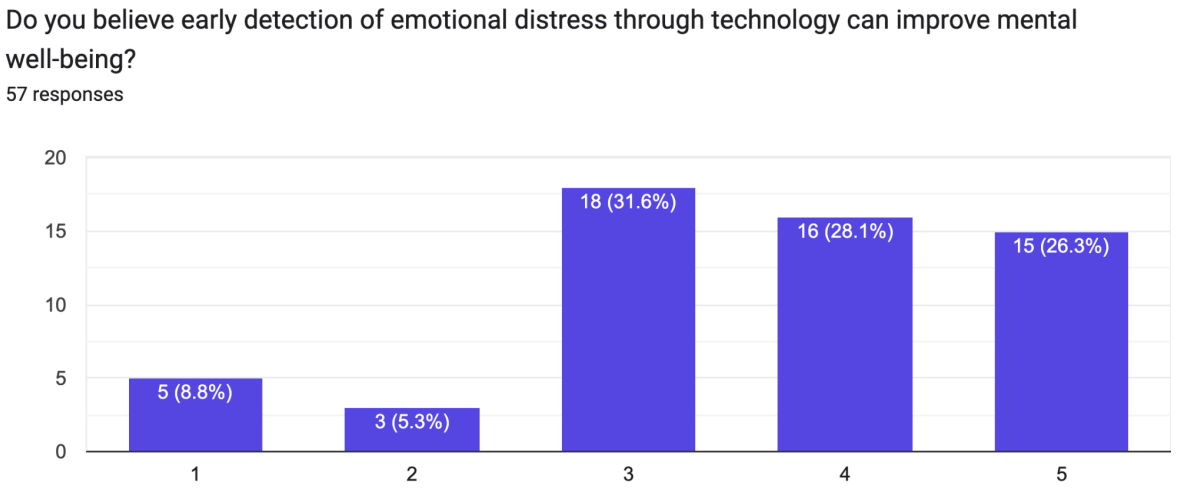


Figure 7: Attitudes Toward Early Detection Techology

Upon examining the commonalities in reporting high stress levels from their most chronic sources of stress, we noted that many respondents reported being under academic pressures (66.7% of exam deadlines; 57.9% of academic workload); family or personal problems (59.6%), social situations (36.8%); public speaking & presentations (33.3%); being in crowd of people (31.6%); and being in loud environments (29.8%); and sudden change in routine (31.6%). These aforementioned triggers limit the user's manual ability to reach out to available support tools; thus we decided not only to implement passive assistance but also to provide support via low effort methods.

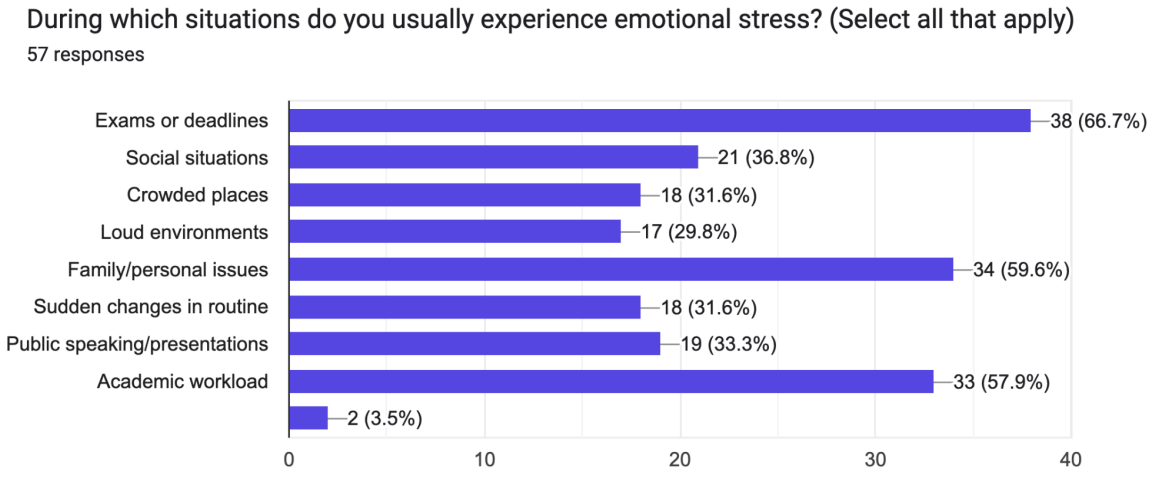


Figure 8: Sources of Emotional Stress

Further, we explored how individuals cope with and manage their feelings of distress. Based on our data, the majority of respondents reported that when they feel distressed they often use the following strategies to help them cope: by themselves (52.6%) and/or listening to music

(36.8%) or using other ways to calm themselves down (36.8%). Some people contact others for support (24.6%) or employ breathing exercises (26.3%) either through their smart phone applications (28.1%). We noted that 28.1% of respondents reported ignoring their distress entirely, which suggests to us a gap in accessible intervention tools.

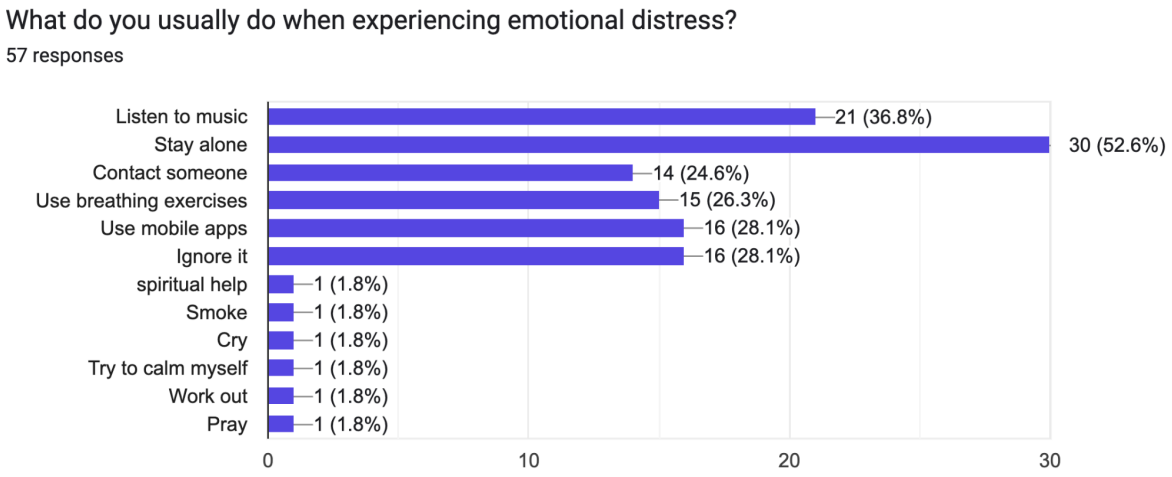


Figure 9: Coping Strategies for Emotional Distress

Technology and Wearables

A majority (87.7%) of the respondents indicated that they have never used any form of mental health or stress management application, suggesting that there is a low level of overall use of digital tools for mental wellness by this demographic.Of respondents that have used a mental health or stress management application (12.3 %) most were not able to identify one specific kind of application and therefore do not appear to be aware of or retain knowledge on mental health or stress management applications to a large degree.

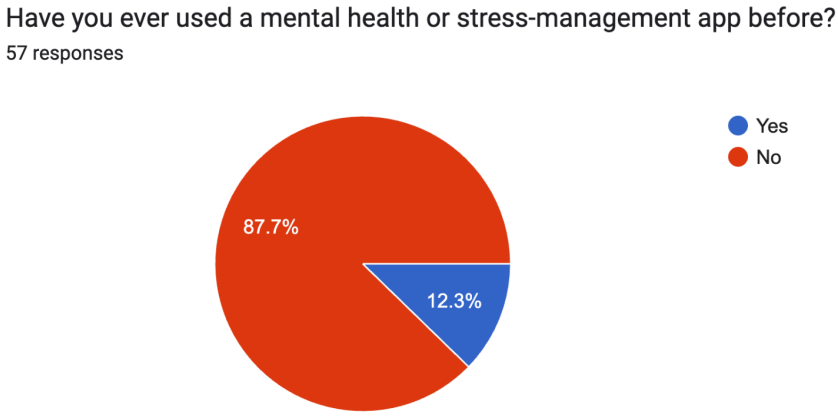


Figure 10: Mental Health App Usage

In relation to wearables, again most respondents (66.7 %) indicated they do not own a smart watch or fitness tracker; while 33.3 % indicated they own either device.To address this limitation, we designed EmotiTrack such that essential features—including breathing guidance and emergency support—remain fully functional on a mobile device without requiring a wearable.

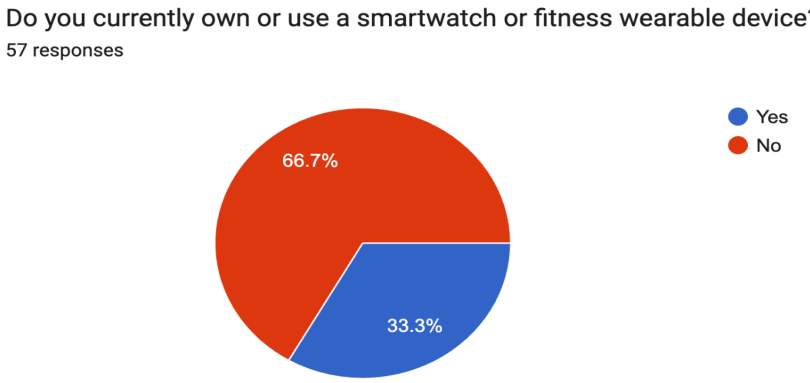


Figure 11: Smartwatch and Wearable

Furthermore, we found that 75.4% of respondents reported that they did not rely on digital tools for emotional regulation. We identified several key limitations in existing tools: the need for manual activation during stressful moments (39.1%), lack of offline functionality (43.5%), excessive notifications (34.8%), privacy and security concerns (39.1%), and lack of condition-specific design (30.4%). We used these findings to directly inform our design decisions related to passive operation, offline support, simplified interaction design, and consent-first architecture.

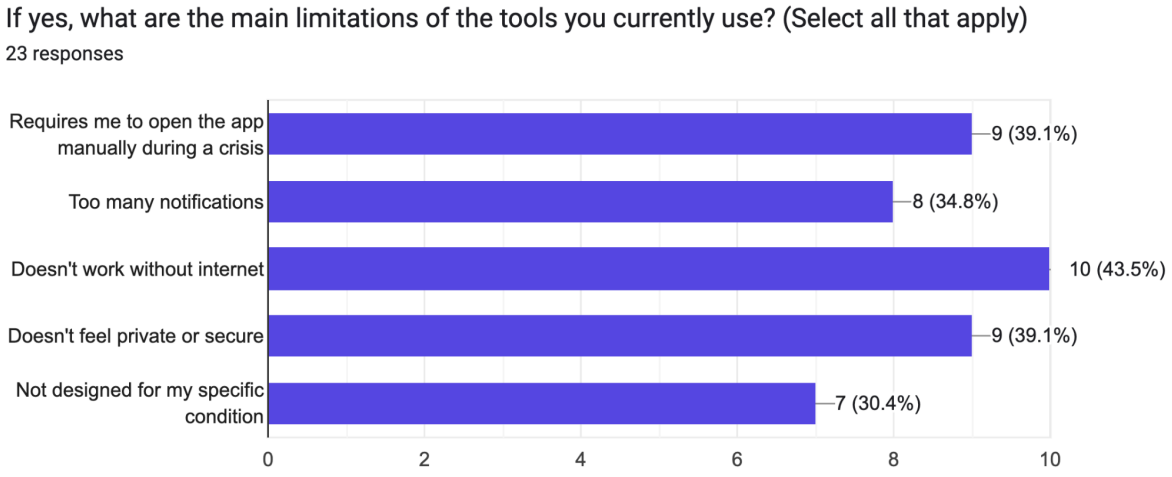


Figure 12: Limitations of Current Mental Health Tools

The comfortability with background tracking was split among study participants, as we found that 45.6% expressed comfort (4 or 5 on a scale of 1–5) while the remaining 54.4% indicated either neutral or negative feelings (1, 2, or 3). A subset of participants identified privacy/data use concerns that directly informed the implementation of a consent-first on-boarding experience and local processing of user data.

EmotiTrack Features

When we asked about preferred notification styles during emotional distress, we found that silent vibration only was the most selected option (47.4%), followed by soft sound alerts (38.6%). Visual prompts (28.1%), reduced animations or motion (17.5%), combinations of the above (22.8%), and voice guidance (7%) came after. We believe these findings support the inclusion of customisable, low-intrusion intervention preferences within our system.

We found that haptic feedback through wearable devices was the most preferred intervention method during a distress episode, selected by 52.6% of respondents. This was followed by audio or sound cues (35.1%), visual on-screen prompts (24.6%), automated caregiver alerts (19.3%), and none of the above (17.5%).

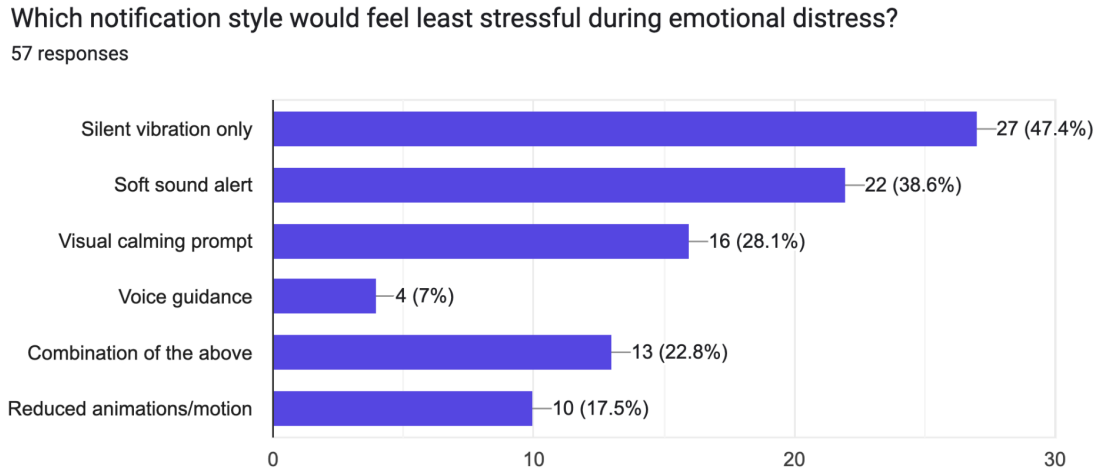


Figure 13: Preferred Notification Methods

We found that responses regarding caregiver notifications were divided. Some users endorsed emergency-only alerts (31.6%), while 14% supported always-on alerts, 24.6% indicated it would depend on the specific caregiver, and 29.8% preferred no external notifications at all. This directly informed our design of an optional and fully user-controlled caregiver access system with granular consent settings.

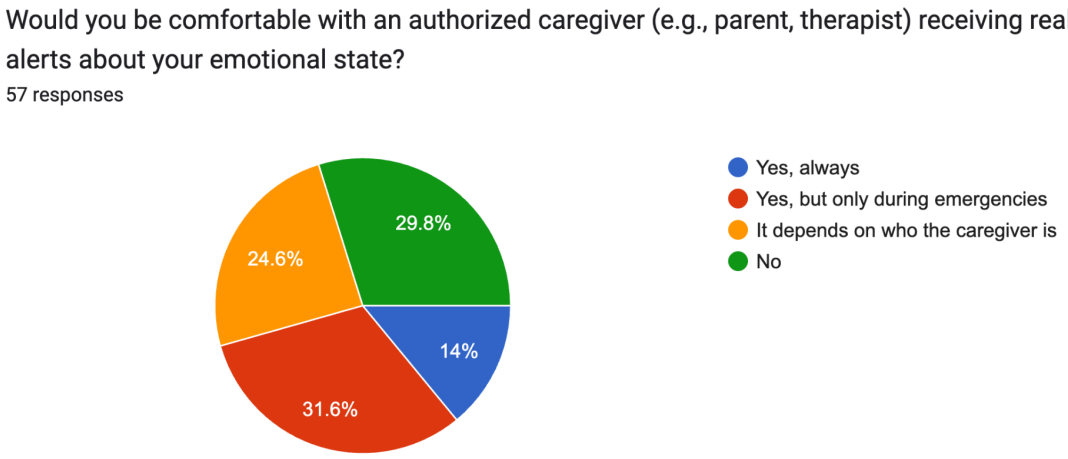


Figure 14: Caregiver Alert Preferences

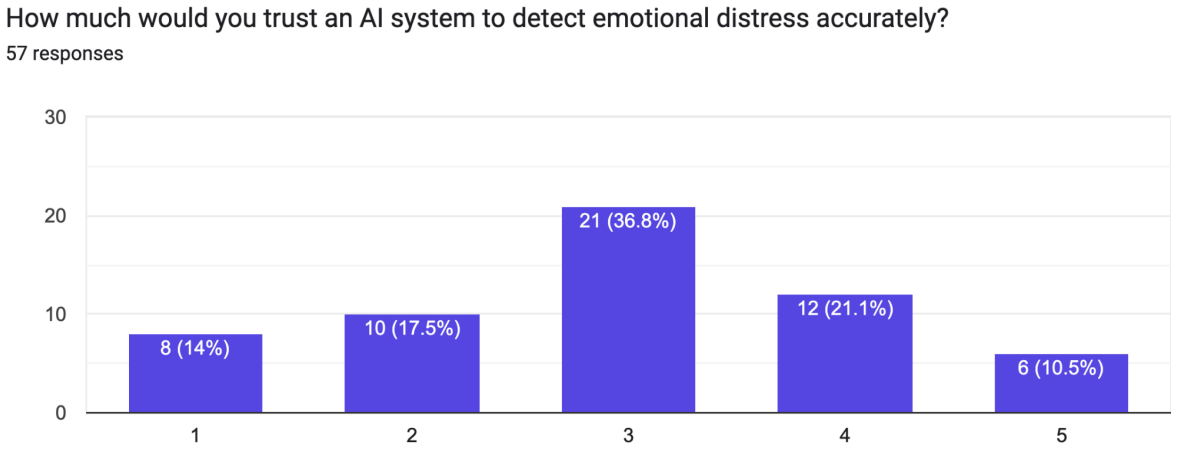


Figure 15: Trust in AI-Based Distress Detection

The findings from our survey indicated that offline capabilities are extremely important as indicated by a total score of 70.2% with respect to their relevance for our customers and an absolute necessity assigned to this functionality through a total rating of 45.6% (i.e. receiving ratings of 4 or higher). Thus, we were inspired by this data to provide offline grounding exercises, breathing instructions, and basic tools. All three features were heavily weighted in support of offline grounding exercises, breathing direction, and basic supportive features; thus, it influenced our selection of offline grounding exercises, breathing direction, and other essential supports.

System Design Concerns

We identified the following primary concerns raised by respondents regarding AI-based wellbeing systems: accuracy of AI detection (42.1%), reliability of the system (24.6%),

privacy and data security (19.3%), social stigma (5.3%), and no concerns (8.8%). We believe these findings indicate that trust and reliability are critical determinants of user adoption. Consequently, we designed EmotiTrack to prioritise transparency, user control, and the minimisation of false or unnecessary alerts through context-aware behavioural pattern analysis, rather than direct emotional classification.

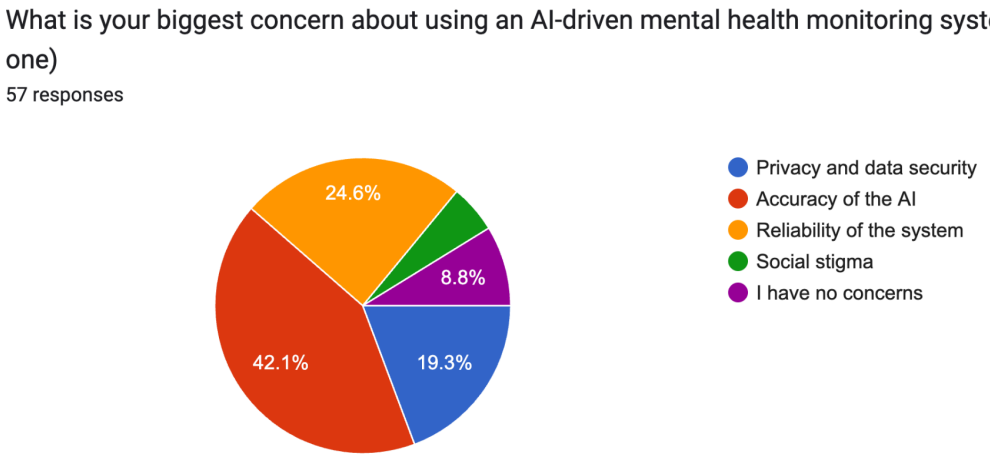


Figure 16: Concerns About AI Mental Health Monitoring

We also asked what would stop people from using EmotiTrack. Barriers to adoption for participants of the survey included the chance of receiving a false alert (54.4%) or being notified too often (36.8%) and privacy concerns about the application (40.4%). Participants indicated that barriers included excessive battery usage (28.1%), a negative social stigma associated with technology (24.6%), costs (24.6%) and concerns about over-reliance on artificial intelligence (3.5%) for some participants while 17% of the total number of respondents did not indicate any reservations about using the app, so a portion of the intended population is likely to use the app.

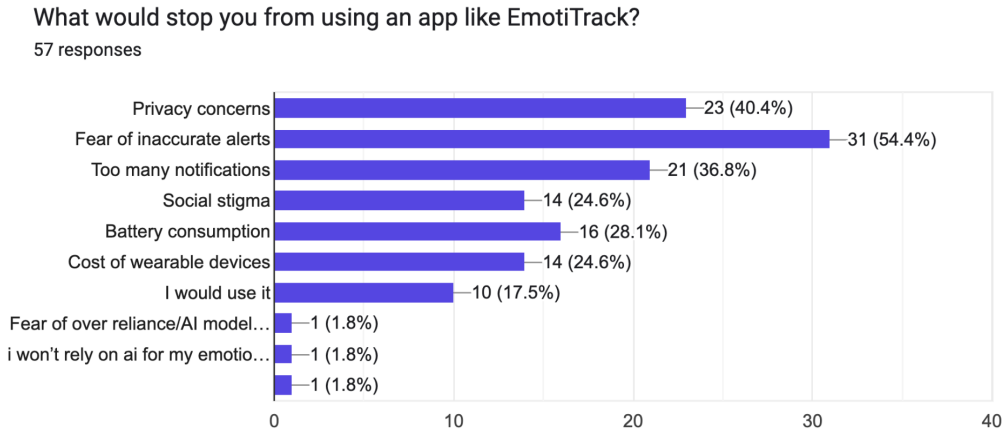


Figure 17: Barriers to EmotiTrack Adoption

User Interface Preferences

We found that respondents demonstrated a strong preference for calm and minimal interface design. The calm colour palette (66.7%), minimalistic design/simplicity (64.9%), one touch navigation ease (42.1%), customisation of themes (28.1%), readability from a distance (19.3%) and high contrast (15.8%) were the most commonly chosen preferences for interface feature sets.

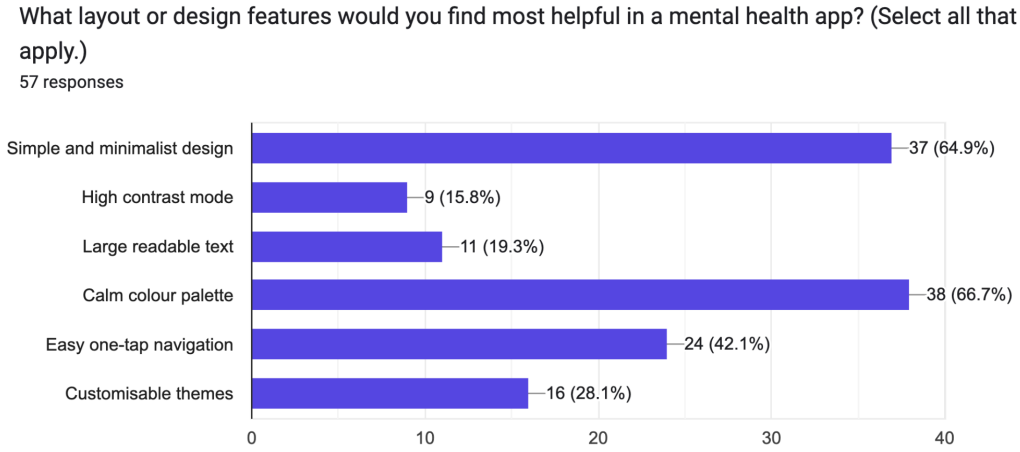


Figure 18: Preferred Mental Health App Features

The calm/safe colours (50.9%), simplicity (42.1%) and guided breathing animations (40.4%) as Interfaces styles to use, followed by Dark Mode (36.8%), non-sensory (28.1%), large button (24.6%) and limited motion (10.5%) were the most commonly selected interface styles during periods of heightened stress. We believe this supports the inclusion of an adaptive UI that reduces complexity and visual stimulation when elevated stress-related patterns are detected.

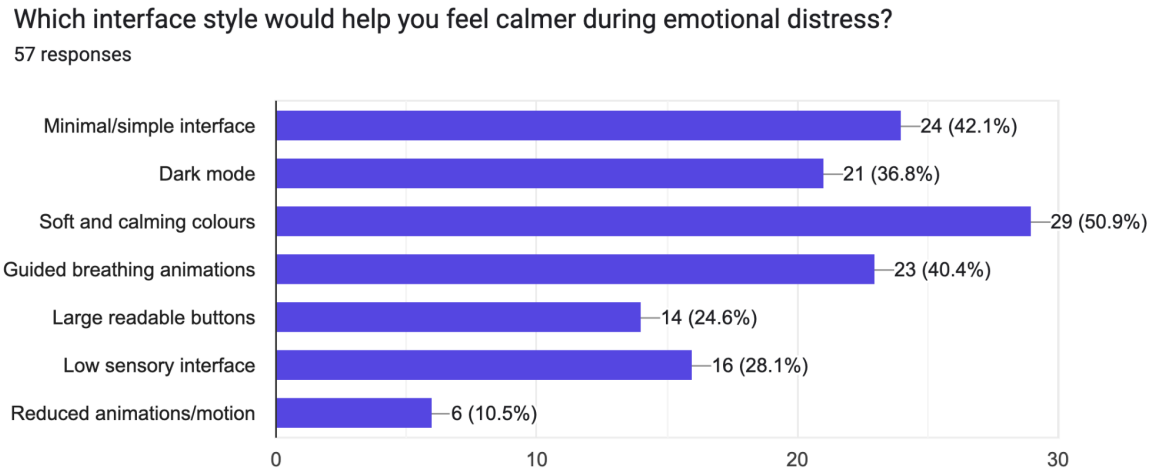


Figure 19: Preferred Calming Interface Styles

Our findings indicate that accessibility is significant to a large number of respondents (49.1 percent). The data from this survey indicate a considerable percentage of respondents express they have some form of accessibility need; 29.8% expressed a sensory need, 24.6% expressed a visual need, and 19.3% expressed a cognitive need. These results reinforce our stated commitment as an organization to adhere to inclusive design principles and WCAG 2.1 compliance standards when designing our products and services

Overall Perception

When we asked whether respondents believed early detection of emotional distress through technology could improve mental wellbeing, we found that 54.7% expressed strong agreement (ratings 4 or 5 on a 5-point scale), while 31.6% were neutral and 14% were skeptical. This suggests to us moderate optimism toward technology-assisted emotional monitoring.

We found that trust in AI accuracy was more reserved. Only 31.6% of respondents expressed strong trust (ratings 4 or 5), while 36.8% were neutral and 31.6% expressed low trust (ratings 1 or 2). This, in our opinion, supports the importance of clear communication between systems, user educational onboarding, and conservative alert thresholds.

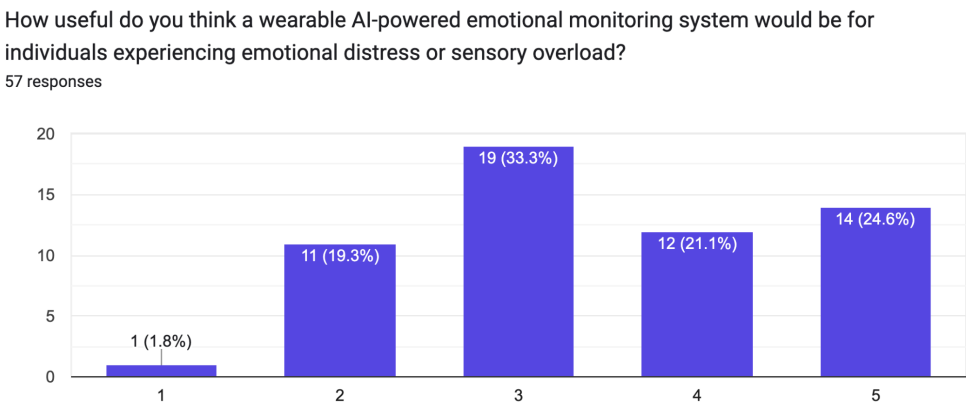


Figure 20: Perceived Usefulness of AI-Powered Monitoring

Overall, we found that respondents demonstrated moderate to positive interest in the concept of EmotiTrack. Of participants surveyed in this study (51 total), 33 percent said YES they could see themselves using an emotional wellness app or having at least some interest in using it (the number who might use it was higher), while 50 percent answered MAYBE and no one said NO. Similarly, when asked if they would recommend such an app to others who could benefit from it, 49 percent said YES, 35 percent said MAYBE, and 15.8 percent said NO. While not all of the survey takers would actually wish to use something like this, there clearly were others who felt it would be useful for another in extreme emotional distress.

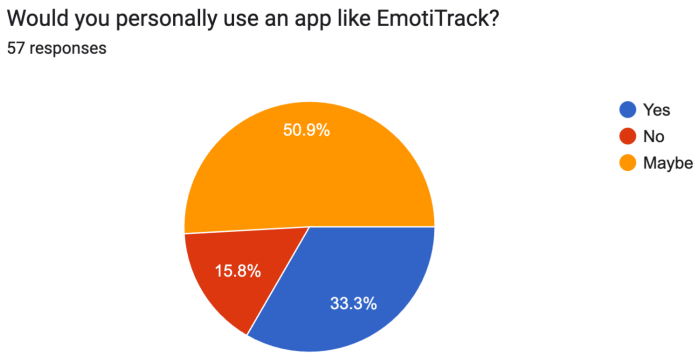


Figure 21: Intention to Use Emotitrack

One thing we noticed was that many "maybes" indicated that trust, privacy assurances, system transparency, and demonstrated accuracy would be a major consideration for adoption. This strengthens our belief in consent driven design, explicit limitation of system performance and use of iterative user feedback integration. For the open feedback, we had various responses of more accuracy, distinguishing between a higher HR when running and when in panic, cheaper device prices, suggestions of progress tracking and comparing once a week, adding music to help with anxiety, and more options for using the device and less with AI, more with algorithms and checking by experts. All of this will help guide our upcoming EmotiTrack development plans.

7.2 System Requirements

We around our questionnaire results and the design decisions that were discussed in Section 3 and came up with the central abilities that EmotiTrack needs to supply to be utilized properly. We organised these into functional requirements—what the system must do—and non-functional requirements—how the system must perform. We also documented the data elements the system handles and captured several requirements using Volere shells for traceability. Our requirements prioritise passive operation, user consent, offline resilience, and accessibility, all of which emerged as critical themes from our 57 survey respondents.

7.2.1 Functional Requirements

Our functional requirements define the specific behaviours and features that EmotiTrack must implement. We derived these directly from user feedback: the need for continuous monitoring without manual input, the preference for haptic interventions, the demand for offline functionality, and the strong emphasis on user control over data and caregiver access.

The table below summarises our twelve functional requirements. Each requirement is uniquely identified, titled, and described using "shall" statements to ensure unambiguous implementation criteria.

ID	**FR-01**
Title	Passive Biometric Monitoring
Description	The system shall continuously monitor the user's heart rate variability (HRV) and movement data via a paired smartwatch without requiring manual input from the user at any point during an active monitoring session.

ID	**FR-02**
Title	Contextual Distress Classification
Description	The system shall apply a contextual logic filter that cross-references HRV data with accelerometer readings to distinguish emotional distress from elevated heart rate caused by physical exertion, reducing false-positive distress alerts.

ID	**FR-03**
Title	Haptic Grounding Intervention
Description	The system shall deliver rhythmic haptic feedback through the smartwatch to guide users through an evidence-based diaphragmatic breathing exercise upon confirmed detection of a distress episode.

ID	FR-04
Title	Adaptive Contextual User Interface
Description	The system shall automatically transition the mobile application interface to a high-contrast, minimalist display mode—removing non-essential UI elements—when acute stress is detected and restore the standard interface once the episode subsides.

ID	FR-05
Title	Automated SOS Beacon
Description	The system shall trigger an automated SOS alert to a minimum of three pre-defined emergency contacts, including the user's current GPS coordinates and distress severity level, if distress persists beyond a user-configurable time threshold (default: 90 seconds).

ID	FR-06
Title	Caregiver Portal Access
Description	The system shall provide a role-based caregiver portal through which authorised individuals may view real-time emotional status updates, historical wellness reports, and SOS event logs, accessible only following explicit user consent.

ID	FR-07
Title	Historical Pattern Dashboard
Description	The system shall store and display a timestamped historical log of emotional episodes, enabling users and healthcare professionals to identify patterns, environmental triggers, and intervention effectiveness over time.

ID	FR-08
Title	Offline Resilience Kit
Description	The system shall support full offline functionality, providing access to pre-loaded grounding exercises, emergency contact details, and basic haptic intervention without requiring an active internet connection.

ID	FR-09
Title	Neuro-Inclusive Persona Profiles
Description	The system shall allow users to create, edit, and switch between persona profiles tailored to their specific condition (panic disorder or autism spectrum), adjusting detection sensitivity thresholds and preferred intervention modalities accordingly.

ID	FR-10
Title	Consent-First Onboarding
Description	The system shall implement a consent-first onboarding flow in which users explicitly grant or revoke granular permission for each category of data collection, AI processing, and caregiver access before any monitoring functionality is activated.

ID	FR-11
Title	Supplementary Behavioural Data Capture
Description	The system shall capture supplementary behavioural data from the smartphone — including typing cadence and touch pressure — as secondary indicators of cognitive load, processed locally and discarded after classification.

ID	FR-12
Title	Manual Emotional State Logging
Description	The system shall allow users to manually log their emotional state at any time via a single-tap input, enabling hybrid passive-active data collection to improve AI model personalisation over time.

7.2.2 Non-Functional Requirements

Our non-functional requirements describe how EmotiTrack should behave instead of defining its capabilities. We determined those based on the quality attributes which were the most important for our respondents: security, speed, reliability, and accessibility. In our questionnaire, 42.1% of the respondents indicated accuracy as the first issue they wanted to address, whereas 19.3% brought up privacy concerns, and 36.8% mentioned the problem of notification overload. From those numbers, we knew that performance and reliability were as essential as functionality.

Our technical limitations include handling real-time biometric streams, secure encryption of medical information, and scaling to support multiple thousands of concurrent users. The following table presents our six main non-functional requirements.

ID	NFR-01
Title	Security
Description	All user health data shall be encrypted end-to-end using AES-256 encryption both in transit and at rest, in compliance with GDPR (Regulation (EU) 2016/679) and applicable national health data protection legislation.

ID	NFR-02
Title	Performance
Description	The AI distress detection engine shall produce a classification output within three seconds of receiving a biometric data input from the wearable device, ensuring timely haptic or UI intervention delivery.

ID	NFR-03
Title	Usability & Accessibility
Description	The application interface — including the adaptive stress-mode UI — shall conform to WCAG 2.1 Level AA accessibility standards, ensuring operability by users with visual, cognitive, and motor impairments (W3C, 2018).

ID	NFR-04
Title	Reliability
Description	The wearable monitoring component shall maintain an uptime of no less than 99.5% during active user sessions, with automatic local data buffering activated within five seconds of any connectivity loss to prevent data gaps.

ID	NFR-05
Title	Scalability
Description	The cloud-based AI processing engine shall be architecturally capable of supporting a minimum of 10,000 concurrent active users without degradation in classification response time beyond the NFR-02 threshold, using horizontal auto-scaling infrastructure.

7.2.3 Data Requirements

Based on the functional requirements and privacy obligations, EmotiTrack identified the data it collects, processes, and stores. 54.4% of the respondents expressed privacy concerns and 82% were interested in local data storage. The results influenced how we handle data: minimize transfers to the cloud, limit data processing of raw sensor data on device, and enable user control of data retention and deletion per user choice.

Each of the data items collected is documented in Table 1 below, along with the data source and data type and data quality rules. They are designed to balance usefulness of data with privacy of the user. For instance, raw data from the accelerometers will be purged after seconds once classified and only the resultant binary output will be kept.

DR No.	Data Item	Source	Data Type	Quality Rule
DR-01	Heart rate variability (HRV) readings	Wearable device	Integer (bpm) + Float (RMSSD ms)	Sampled minimum once per second during active sessions; retained for 12 months in encrypted user profile.
DR-02	GPS location data (SOS events only)	Mobile device	Decimal degrees (latitude, longitude) JSON with timestamp	Purged from server within 24 hours of event resolution unless user explicitly consents to extended retention.
DR-03	Emotional episode event log	System + User	Structured JSON: timestamp, severity (0–10), context tag, intervention, duration	Retained minimum 12 months; accessible to user and consented healthcare professional only.
DR-04	User persona profile configuration	User + App	Encrypted JSON object	Stored locally on device; never transmitted to cloud without explicit consent.
DR-05	Accelerometer and gyroscope readings	Wearable device	3-axis float arrays (m/s^2) at 50Hz	Raw data discarded within 5 seconds of classification; only binary output (physical/emotional) retained.
DR-06	Anonymised aggregated usage data (AI retraining)	System	Statistical aggregates only; no PII	No personally identifiable information retained in training dataset without explicit informed consent.

7.2.4 Volare Requirement Shells

<table>
<tr><th colspan="3">Requirement Shell</th></tr>
<tr><td>Requirement No: FR01</td><td>Requirement Type:
Functional</td><td>Event/Use Case: 1- User wears paired smartwatch during daily activity</td></tr>
<tr><td colspan="3">Description: The system shall continuously monitor the user's heart rate variability and movement data via a paired smartwatch without requiring manual input from the user at any point during an active monitoring session.</td></tr>
<tr><td colspan="3">Rationale: The target user population — individuals with panic disorder and autism spectrum conditions — are frequently unable to initiate help-seeking during an active distress episode. Passive monitoring removes this dependency and ensures continuous system awareness without user effort.</td></tr>
<tr><td colspan="3">Source: User questionnaire Q1 (70% experience distress 3+ times per week); Q2 (open responses citing inability to initiate app use during episodes)</td></tr>
<tr><td colspan="3">Fit Criterion: The system shall collect and log HRV readings at a minimum frequency of once per second during an active session, with zero user interaction required. Verified via automated sensor log audit over a 24-hour test period.</td></tr>
<tr><td colspan="2">Customer Satisfaction: 5</td><td>Customer Dissatisfaction:</td></tr>
<tr><td colspan="2">Dependencies: Paired WatchOS/WearOS device with HRV and accelerometer sensors; active Bluetooth connection to mobile hub</td><td>Conflicts: -</td></tr>
<tr><td colspan="3">Supporting Materials: Majumder et al. (2017); Can et al. (2019)</td></tr>
<tr><td colspan="3">History: Created by Group 12, EmotiTrack</td></tr>
</table>

Requirement Shell		
Requirement No: FR02	**Requirement Type:** Functional	**Event/Use Case:** 2 - System receives elevated HRV reading from wearable
Description: The system shall apply a contextual logic filter that cross-references HRV data with accelerometer readings to distinguish emotional distress from elevated heart rate caused by physical exertion, reducing false-positive distress alerts.		
Rationale: False-positive alerts — where physical activity triggers an erroneous distress detection — represent a significant risk for the target user group, as unnecessary alerts can themselves trigger anxiety or distrust of the system. Contextual filtering is essential to maintain user confidence.		
Source: User questionnaire Q10 (27% cited accuracy/false alerts as primary concern)		
Fit Criterion: In a controlled test environment of 100 simulated biometric events (50 physical exertion, 50 emotional distress), the contextual filter shall correctly classify a minimum of 90% of events with no more than 10 false positives across both categories.		
Customer Satisfaction: 4		**Customer Dissatisfaction:**
Dependencies: FR-01 (passive biometric monitoring); accelerometer and gyroscope data streams (DR-05)		**Conflicts:** - none
Supporting Materials: Can et al. (2019)		
History: Created by Group 12, EmotiTrack		

Requirement Shell		
Requirement No: FR03	**Requirement Type:** Functional	**Event/Use Case:** Distress episode confirmed by AI engine
Description: 3 The system shall deliver rhythmic haptic feedback through the smartwatch to guide users through an evidence-based diaphragmatic breathing exercise upon confirmed detection of a distress episode.		
Rationale: Haptic feedback was the most preferred intervention modality among respondents (78%), with 91% of the autism/caregiver group specifically preferring it over audio, which was reported as worsening sensory overload. Diaphragmatic breathing has established clinical efficacy as a grounding technique for panic disorder and anxiety.		
Source: User questionnaire Q4 (78% haptic preference; 91% autism group preference); Zaccaro et al. (2018)		
Fit Criterion: Upon distress confirmation, haptic feedback shall be initiated within 3 seconds. The feedback pattern shall complete a full 4-7-8 breathing cycle (4s inhale, 7s hold, 8s exhale) and automatically repeat until the user dismisses or distress subsides.		
Customer Satisfaction:		**Customer Dissatisfaction:**
Dependencies: FR-01 (distress detection); FR-02 (contextual classification); paired smartwatch with haptic actuator		**Conflicts: - none**
Supporting Materials: Zaccaro et al. (2018); Kern et al. (2006)		
History: Created by Group 12, EmotiTrack		

Requirement Shell		
Requirement No: FR05	**Requirement Type:** Functional	**Event/Use Case:** 5 — Distress episode persists beyond configurable threshold
Description: The system shall trigger an automated SOS alert to a minimum of three pre-defined emergency contacts, including the user's current GPS coordinates and distress severity level, if distress persists beyond a user-configurable time threshold (default: 90 seconds).		
Rationale: 63% of respondents expressed willingness for caregiver alerts during emergencies, and 58% preferred these to be limited to persistent or severe episodes rather than all distress events. The configurable threshold respects user autonomy while ensuring timely caregiver notification when intervention is genuinely required.		
Source: User questionnaire Q4 (63% caregiver alert preference); Q6 (58% emergency-only preference)		
Fit Criterion: When a distress episode exceeds the configured threshold, SOS notifications shall be delivered to all pre-defined contacts within 10 seconds, including accurate GPS coordinates (±10 metre accuracy) and a distress severity rating. The user shall retain the ability to cancel the alert within the first 10 seconds.		
Customer Satisfaction:		**Customer Dissatisfaction:**
Dependencies: FR-01, FR-02 (distress detection and classification); FR-10 (user consent for caregiver access); DR-02 (GPS data handling); active internet or cellular connection		**Conflicts:** FR-10 — SOS functionality shall not activate unless caregiver access consent has been granted during onboarding.
Supporting Materials: GDPR Regulation (EU) 2016/679		
History: Created by Group 12, EmotiTrack		

Requirement Shell		
Requirement No: FR10	**Requirement Type:** Functional	**Event/Use Case:** 10 New user completes onboarding
Description: The system shall implement a consent-first onboarding flow in which users explicitly grant or revoke granular permission for each category of data collection, AI processing, and caregiver access before any monitoring functionality is activated.		
Rationale: Privacy was the dominant concern among respondents at 48%. For a system handling sensitive mental health data, explicit and granular consent is both an ethical imperative and a legal requirement under GDPR. Users who do not trust the system with their data will not engage with it meaningfully, making consent architecture foundational to the platform's success.		
Source: User questionnaire Q5 (82% prioritised local data storage); Q10 (48% primary concern was privacy)		
Fit Criterion: No biometric data collection, AI processing, or caregiver notification shall be initiated until the user has completed the consent flow and explicitly accepted each permission category. Users shall be able to revoke any individual consent at any time from the settings screen, with revocation taking effect within 60 seconds.		
Customer Satisfaction:		**Customer Dissatisfaction:**
Dependencies: All other functional requirements—FR-01 through FR-09 are contingent on consent being granted for their respective data categories		**Conflicts: -**
Supporting Materials: GDPR Regulation (EU) 2016/679; Char et al. (2018)		
History: Created by Group 12, EmotiTrack		

8.0 Prototype and User Interface Design (UID)

8.1 Overview Prototype

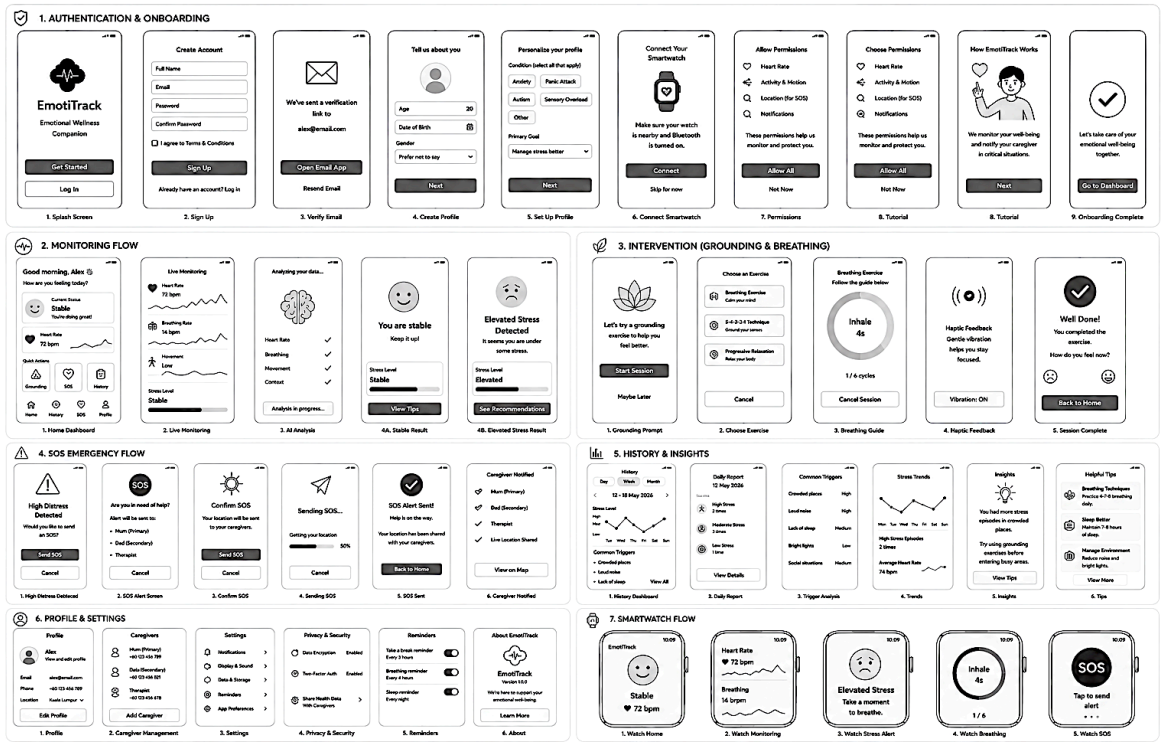


Figure 22: EmotiTrack Low-Fidelity Prototype Overview

EmotiTrack is designed to be easy to use, to be calming and to approach problems with a gentle touch. Users suffering from anxiety, panic attacks, overloading of their senses or other changes in their emotions will be able to easily use the features of the EmotiTrack system as laid out in the low-fidelity prototype including the biometric monitoring, the AI-powered distress recognition, grounding techniques, an SOS feature for emergencies, connection with their caregiver and pairing with their smartwatch. EmotiTrack has been designed with Jakob Nielsen's usability heuristics in mind meaning that it will be easy for users to use the application, they will be able to quickly get help when they need it and they will be able to use the features of the system in a moment of crisis.

8.2 Application of Nielsen's 10 Usability Heuristics

Using Jakob Nielsen's 10 Usability Heuristics EmotiTrack is for people facing emotional distress, anxiety, panic episodes or sensory overwhelm clarity matters most under these conditions And we prioritize ease of use of the application. Interaction becomes smoother when design removes guesswork frustration drops as a result. During intense moments, access to support should feel straightforward, almost automatic. That simplicity does not happen by accident; it grows from structured design choices. What emerges is a tool shaped around real needs, not assumptions. Efficiency here means more than speed - it means reducing mental load precisely when it counts.

Principle 1: Visibility of System Status

Because it runs nonstop, the interface shares ongoing updates about what it's doing right now. Right on the Monitoring Dashboard, numbers like heartbeat count, breath rhythm, motion patterns, and tension markers appear live. When something urgent happens, messages pop up one after another - phrases like "Analyzing Data" show first, then "Sending SOS Alert," followed by "Location Shared," ending with "Caregiver Notified." Each alert arrives in sequence so people know exactly how far along the response has gone. Knowing each step plays out builds quiet confidence the technology works as intended.

Principle 2: Match Between System and the Real World

Most people find EmotiTrack simple because it speaks their language - literally. Take the "Breathing Exercise" - it does what the name suggests, nothing hidden. A "Grounding Session" feels much like what you'd do in therapy, just guided through a screen. Stress Level appears as a sliding scale, not abstract numbers, so changes make sense at a glance. Instead of complex menus, an SOS Alert acts fast, mimicking real emergency signals. Icons play a big role: hearts stand for well-being, not data points. Warning signs pop up only when needed, matching how alarms work outside apps. Location markers show where help is tied, similar to maps in daily life. Buttons look like physical triggers - one press, immediate response - removing guesswork from urgent moments.

Principle 3: User Control and Freedom

Should things go off track, the app supports quick recovery through straightforward controls. Exiting grounding exercises happens whenever needed, no delays. Before alerts reach anyone, they can be stopped mid-process. Personal details adjust smoothly, contact lists update without hassle. Moving around feels natural thanks to visible exits and familiar pathways built into each screen. At every step of the way going back remains a tap away.

Principle 4: Consistency and Standards

Across every screen the layout remains steady through the repeated use of familiar buttons and menus. Positioned without change, the Home, History, SOS, and Profile symbols stay fixed in place. Colour choices match from one view to the next, just like shapes of controls and words on labels. Because these features repeat, people grasp functions faster, their expectations shaped by what came before.

Principle 5: Error Prevention

Before anything goes wrong, EmotiTrack steps in quietly. Take SOS signals - they won't send without a second tap, just to be sure. When someone enters a caregiver's phone number, the system checks it right then. Connection to a smartwatch? That gets confirmed too, prior to any tracking. Mistakes slip through less often because of these small blocks. Fewer slips mean the whole setup works better, more steadily.

Principle 6: Recognition Rather Than Recall

The most essential tools for Grounding, Monitoring, History, SOS, and Profile stay on screen at all times using the bottom menu. This setup cuts down mental effort, since key options appear right away. Instead of recalling steps, people see what they can do thanks to straightforward words, symbols, and cues. Seeing controls clearly removes the need to remember how to reach each area of the app.

Principle 7: Flexibility and Efficiency of Use

EmotiTrack is easy to use, even for people who are new to it. EmotiTrack provides step by step introductions to the functions of the apps for people who are new to them. People who are familiar with the functions of the apps can use the quick access buttons on the main screen to go to the key features of the apps. During stressful moments, users of EmotiTrack have several options. First of all, they can use slow breathing prompts to stay calm. Secondly, they can use sensory strategies to get a grip on their surroundings again. Last but not least, users can always press a panic button in order to get as much help as possible as soon as possible. All of these strategies can be used in different situations and are therefore flexible. It is important that users have the right strategies available for the right situations.

Principle 8: Aesthetic and Minimalist Design

Most screens show just what matters, helping people stay on key actions without extra noise. A calm look comes through gentle hues, straightforward fonts, and space between elements. When tension rises, certain features - like breathing guides or urgent tools - move into view more clearly. Unneeded details fade back, so attention stays where it should. Minimal layout choices shape how easily thoughts settle during intense moments.

Principle 9: Help Users Recognize, Diagnose, and Recover from Errors

Errors trigger straightforward alerts, each paired with practical fixes. Should GPS be turned off, guidance appears on activating location settings for SOS support. Connection troubles with a smartwatch bring tailored advice into view. Quick problem recognition becomes possible

8.3 Application Explanation

8.3.1 Authentication and Onboarding

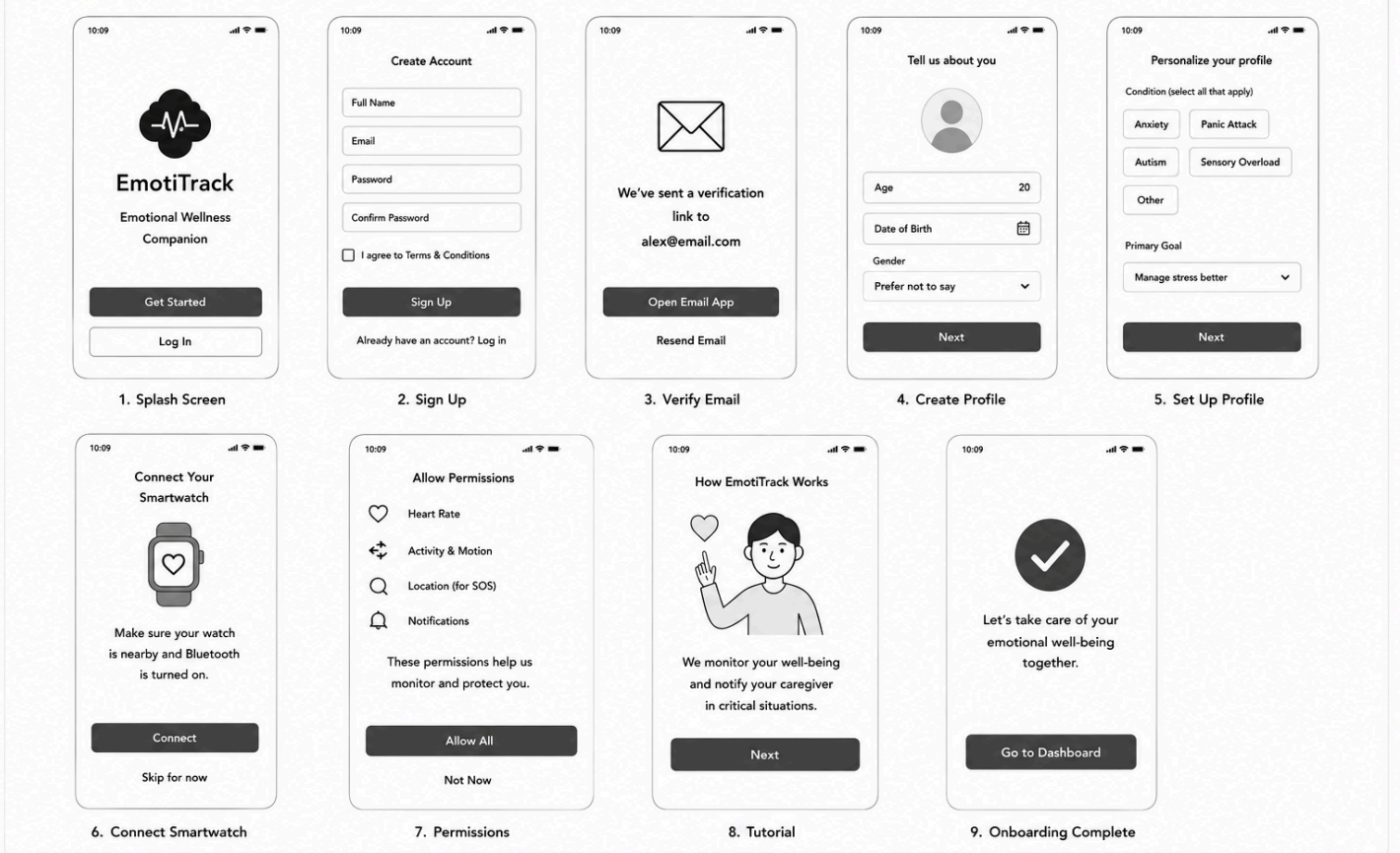


Figure 23: User Authentication and Onboarding Process

Opening the app newcomers meet the home splash screen before moving ahead. Following that moment comes the chance to sign up on the dedicated page. Once registration finishes, confirmation by email becomes necessary. Only after verification do individuals add details into a personal profile. After setting up emotional wellness choices, connecting a smartwatch becomes possible. Permissions come next, required for smooth operation. A brief walkthrough guides each step along the way. Completion leads straight to the Home Dashboard automatically. From there, core features open up tailored to individual needs. Security stays active throughout the experience.

8.3.2 Monitoring Flow

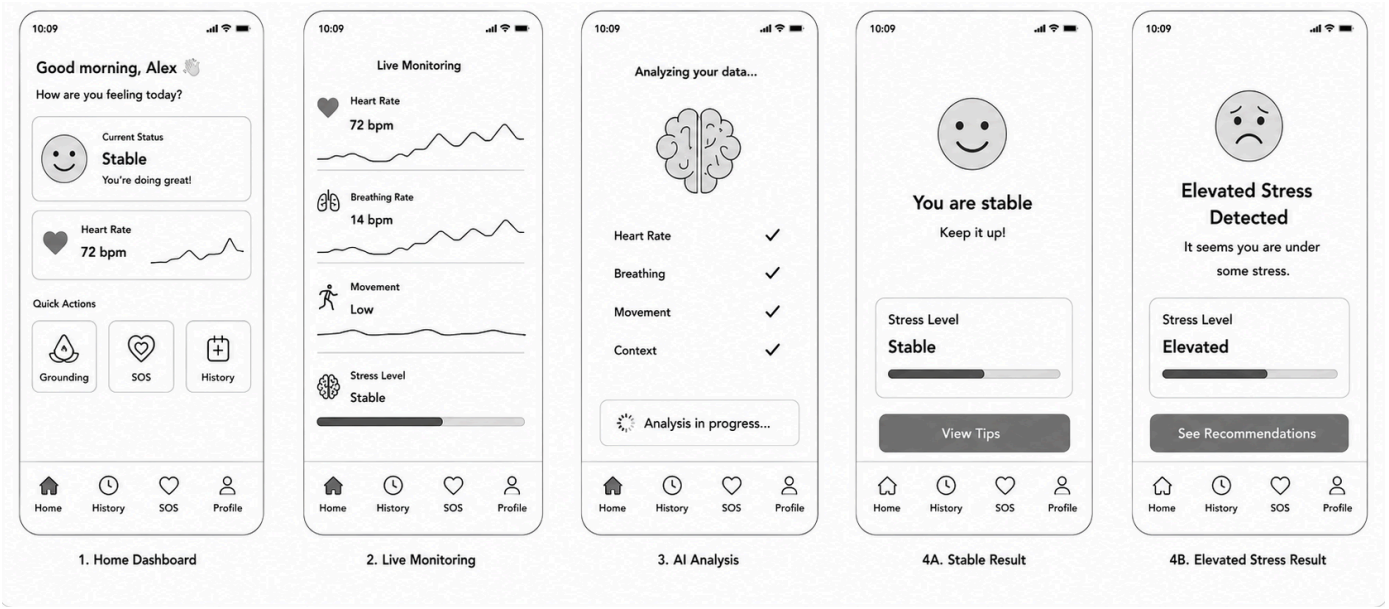


Figure 24: Real-Time Emotional Monitoring Process

EmotiTrack's Monitoring Flow is the core functionality of the Application. Smartwatch's integration with the Application continuously monitors and collects the user's various physical health indicators such as heart rate, breathing rate and physical movement. This collected data is then analyzed by the Application's AI engine to assess the user's emotions. In the case of normal circumstances, users will see a stable status update. However, in the case of a user experiencing higher levels of stress and or anxiety than normal, users will be alerted to possible interventions to help alleviate the user's current stress and or anxiety levels. Monitoring users' emotions, allows for earlier intervention, prior to any potential deterioration in the user's current emotional state.

8.3.3 Intervention Grounding and Breathing

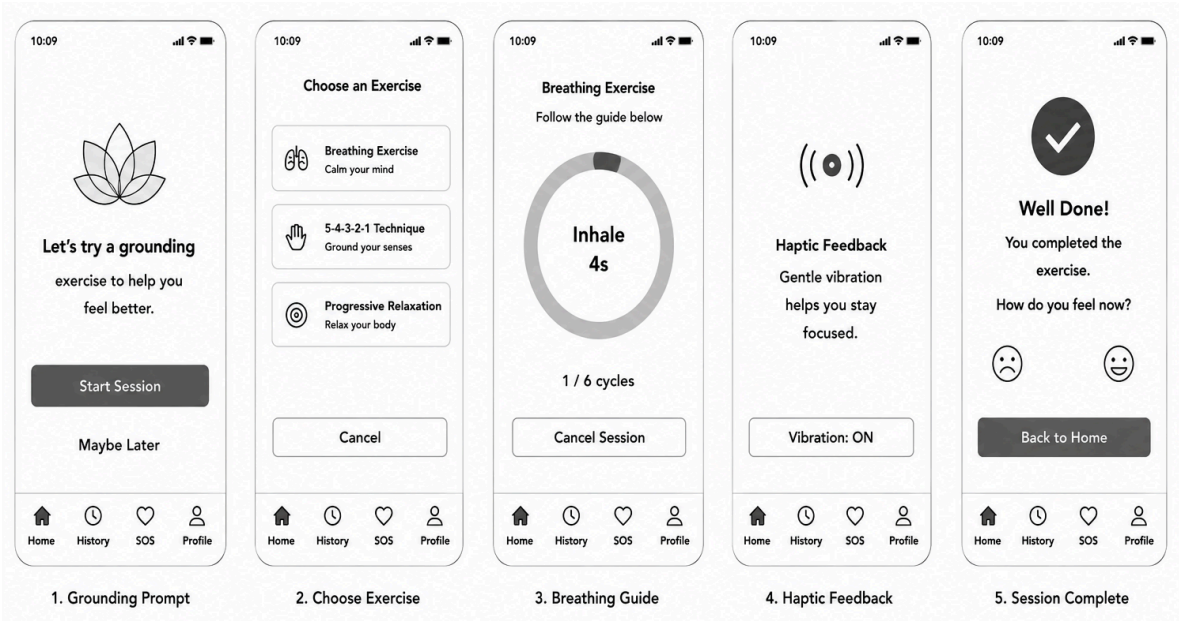


Figure 25: Grounding and Breathing Support Process

When stress rises the AI triggers a support sequence. As this happens, grounding methods appear through the app. Depending on what feels right, people choose among several soothing options. While practicing, the watch gently pulses, guiding each breath. Its rhythm matches the suggested tempo, keeping pace with the user. Once finished, the session gets logged automatically before redirecting back to the main screen. Self-monitoring becomes easier this way, easing feelings of stress, overwhelm, or heightened sensitivity along the shift.

8.3.4 SOS Emergency

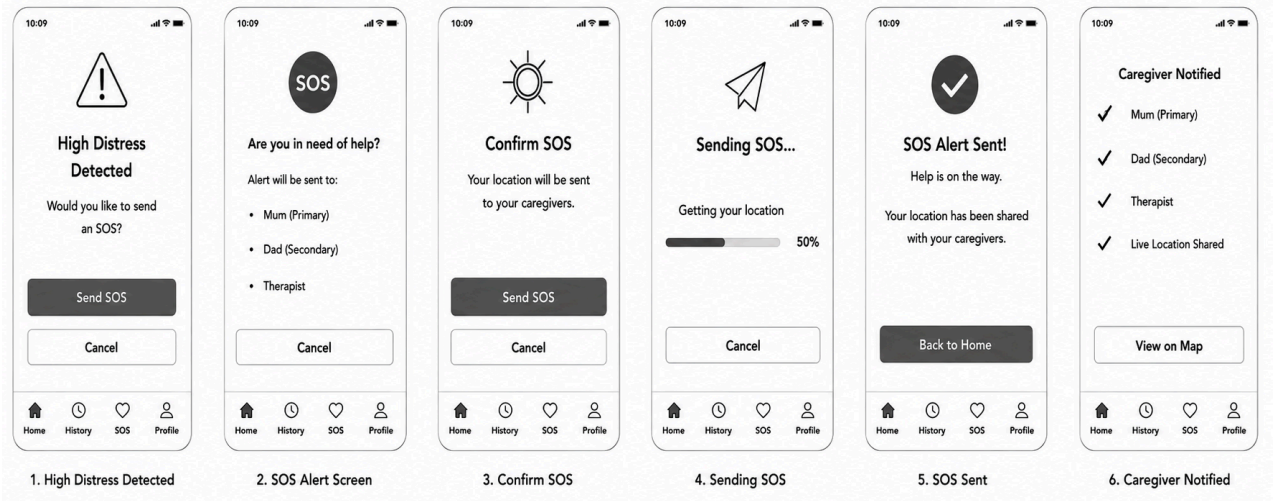


Figure 26: Emergency SOS Assistance Process

Should things spiral emotionally, help arrives fast through the SOS Emergency Flow. Activation happens either by user choice or suggested automatically if extreme stress registers. A prompt checks intent first - this stops unintended triggers. Confirmation leads straight to location capture via GPS. From there, alerts move directly to trusted contacts previously approved. Speed meets caution without delay. Once help is asked for, users get a message saying it went through. Caregivers are alerted right after. Because of this, people stay safer when something urgent happens. Quick contact becomes possible exactly when needed most.

8.3.5 History and Insights

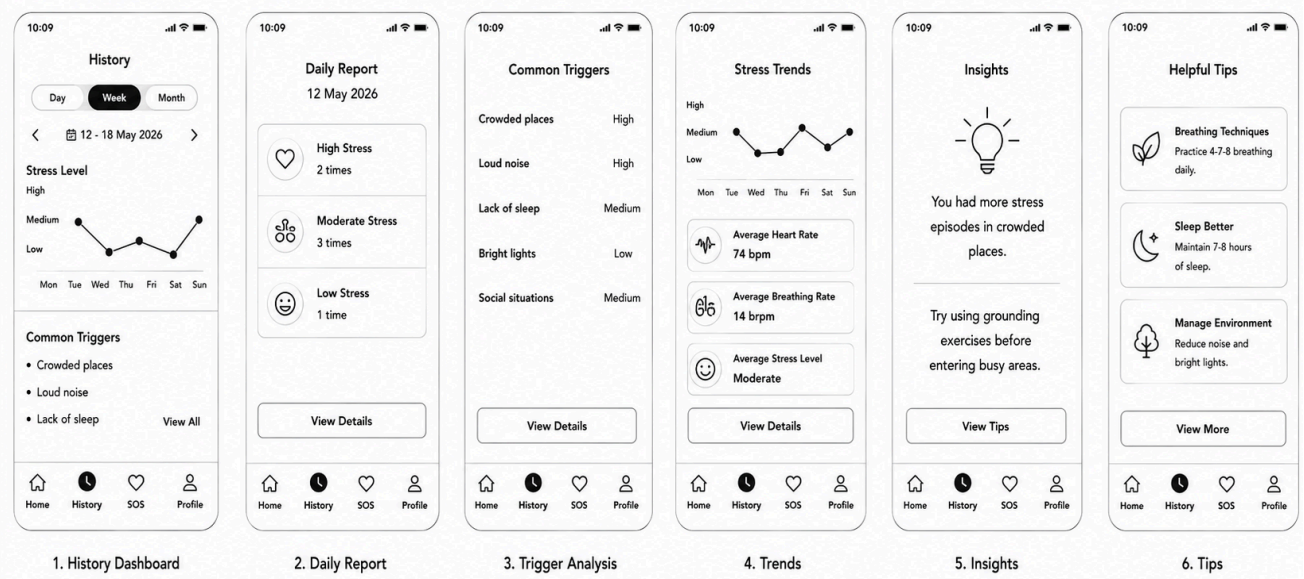


Figure 27: Emotional History and Insights Process

Most days, people look back at how they felt using stored emotion and body readings. Stored records show up each morning, pointing out what often causes tension. Because past actions shape advice given later, habits slowly come into view through repeated observation. Seeing feelings laid out makes it easier to spot surroundings linked to strain. Over time, noticing these links builds stronger ways to handle pressure. Patterns appear not all at once, yet clarity grows with regular check-ins.

8.3.6 Profile and Settings

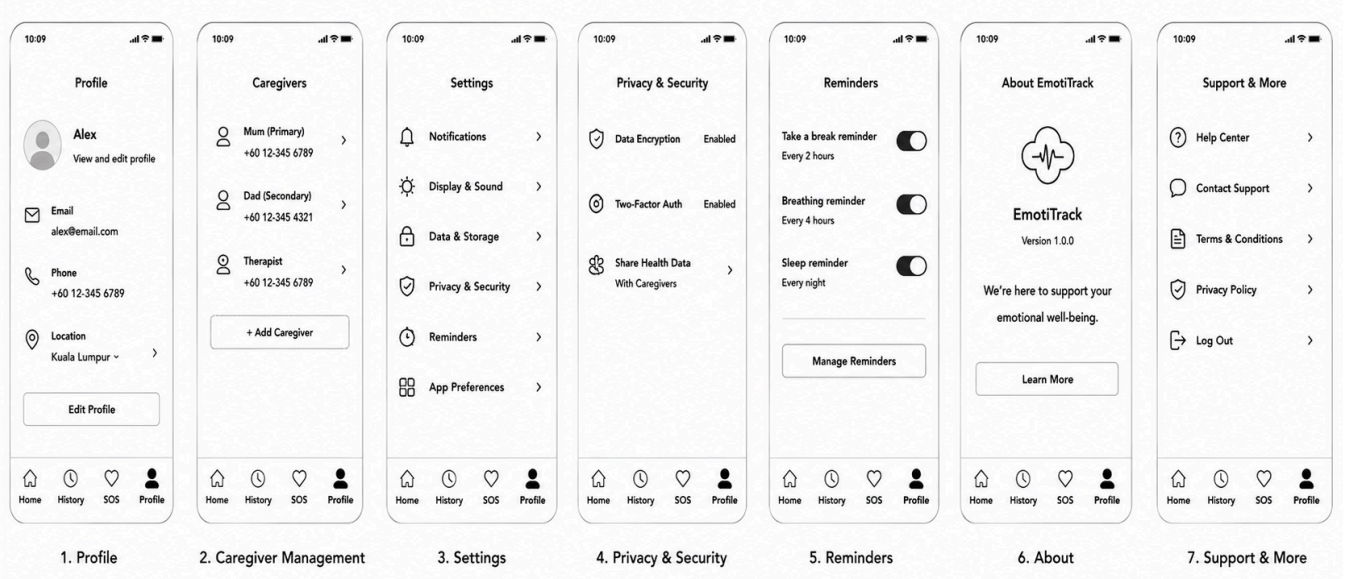


Figure 28: User Profile and Settings Management

Managing personal details becomes possible through the Profile and Settings Flow, where adjustments match individual requirements. Changing contact information sits alongside setting up caregiver links without forced sequences. Privacy controls respond to user choices, just as reminder configurations adapt silently in the background. Preferences unfold gradually, shaped by how each person interacts with the interface over time. Data sharing boundaries appear clearly, paired naturally with alert management features nearby. Control remains visible throughout, yet customisation happens quietly behind every tap or swipe. Experience shifts based on decisions made here, not dictated but gently guided by structure. Personal input shapes outcomes - no defaults dominate, only chosen paths stay active.

8.3.7 Smartwatch and Wearables

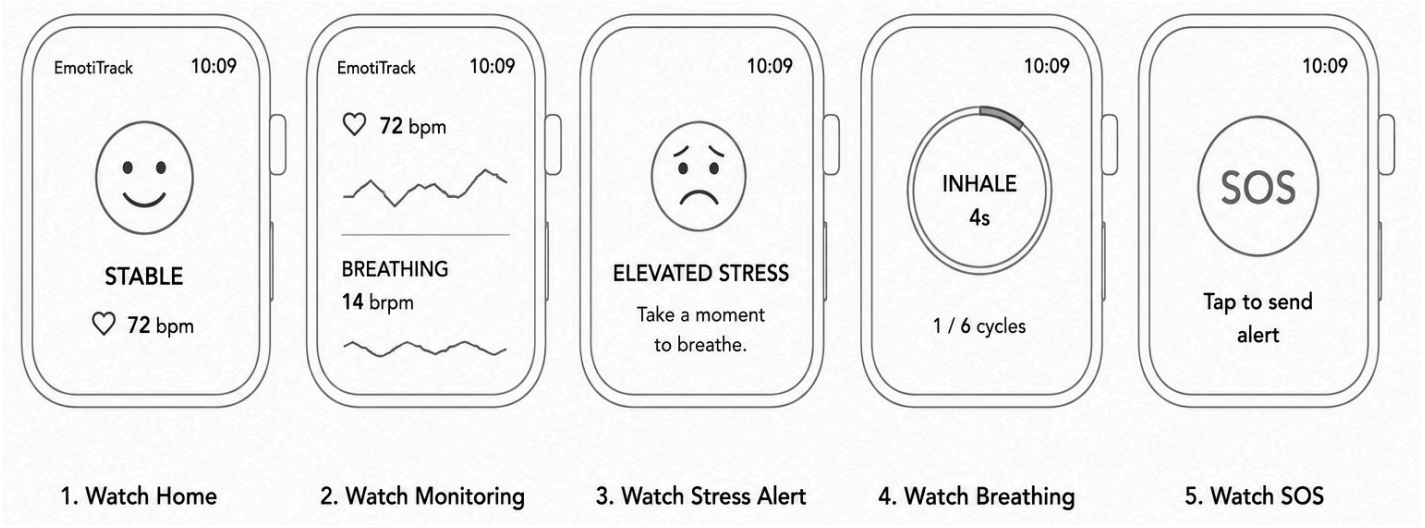


Figure 29: Smartwatch-Based Emotional Monitoring Features

On a wrist-worn device, the Smartwatch Flow brings EmotiTrack features into daily movement. From there, emotion levels appear at a glance, while notifications about rising stress arrive quietly. When tension builds, guided breath work opens with one tap instead of waiting for a phone. Help reaches emergency contacts if needed - no app unlock required. Support stays close, even when hands stay full.

9.0 Conclusion and Future Enhancement

EmotiTrack was created to be a digital wellbeing support platform to tackle the increasing issues of stress, anxiety, sensory overload and emotional self-regulation amongst students and others who might need extra wellbeing support. The proposed system integrates wearable technology, machine learning, cloud services, adaptive user interface and caregiver integration to present wellbeing assistance that is accessible and user-centred. EmotiTrack aims to provide early wellbeing support through the passive monitoring of physiological and behavioural indicators while maintaining user privacy, consent, and control over personal data. EmotiTrack is not a diagnostic, clinical or mental health treatment tool, it is intended as an awareness and wellbeing support.

The project supports the objectives of SDG 3: Good Health and Well-Being by promoting emotional awareness and encouraging healthier coping strategies. EmotiTrack features smartwatch monitoring, adaptive interfaces, grounding exercises, SOS mode, and features for caregivers, creating a supportive environment that empowers users to gain insights into their wellbeing and manage patterns of stress in a more sustainable way. Additionally, the implementation of existing technologies, cloud infrastructure and the subscription model indicates that the proposed solution is technically and economically viable for future deployment. For future enhancement, several improvements may be considered to increase the effectiveness and accessibility of the system. EmotiTrack could get expanded to accommodate more wearable devices in future versions, such as less expensive fitness bands to make it more accessible for people who are not equipped with smartwatches. Further machine learning algorithms can also be added to enhance personalization as it becomes more attuned to individual behaviour over time. Additional features planned for future development are multilingual support, more accessibility options for neurodivergents and better integration with institutional wellbeing services. There may also be advanced analytic dashboards developed for universities, care centres and workplace wellbeing programs to deliver anonymised wellbeing insights without compromising user privacy.

Overall, EmotiTrack is a viable, scalable wellbeing support system that is both technologically advanced and designed with user needs in mind. EmotiTrack's emphasis on emotional awareness, personal privacy, emotional wellbeing and user-centred support has the potential to help users be more aware of their emotional health, adopt healthier coping mechanisms, and promote better self-regulation in real-world contexts.

Appendix

Appendix A: EmotiTrack - System Architecture Diagram

Appendix B: EmotiTrack — User Research Survey

Appendix C: EmotiTrack Low-Fidelity Prototype

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